



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 3723/2
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: BC Iron Limited

1.3. Property details

Property: Mining Lease 46/515
Miscellaneous Licence 46/73
Miscellaneous Licence 46/74
Miscellaneous Licence 46/75
Miscellaneous Licence 46/76
Miscellaneous Licence 46/81
Miscellaneous Licence 46/82
General Purpose Lease 46/9

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:
450.3		Mechanical Removal	Mineral Production

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 29 September 2011

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. The following Beard Vegetation Association has been mapped over the application area (GIS Database):

- **173:** hummock grasslands, shrub steppe; Kanji over soft Spinifex and *Triodia wiseana* on basalt.

Flora and vegetation surveys of an area that included the application area were conducted by Astron Environmental Services in June, July, August and September 2008. The following vegetation communities were identified within the application area (Astron Environmental Services, 2008):

H1a
Corymbia hamersleyana scattered low trees over mixed *Acacia* spp. scattered shrubs to shrubland over *Triodia epactia* hummock grassland;

H1b
Corymbia hamersleyana scattered low trees over mixed *Acacia* spp. shrubland over *Triodia wiseana* hummock grassland;

H2a
Corymbia hamersleyana scattered low trees over mixed *Acacia* spp. scattered shrubs to shrubland over mixed *Triodia epactia* hummock / tussock grassland;

H3a
Eucalyptus leucophloia scattered low trees over mixed *Acacia* spp. scattered shrubs to shrubland over *Triodia epactia* hummock grassland;

H3b
Eucalyptus leucophloia low woodland over mixed *Senna* spp. scattered shrubs over *Triodia epactia* hummock grassland;

H3c
Eucalyptus leucophloia scattered low trees to low woodland over mixed *Acacia* spp. scattered shrubs to shrubland over *Triodia wiseana* hummock grassland;

H3e
Eucalyptus leucophloia scattered low trees over mixed *Senna* spp. scattered shrubs over *Triodia brizoides* hummock grassland;

H4b

Eucalyptus leucophloia low woodland over mixed *Eremophila* shrubland over mixed *Triodia epactia* hummock / *Eriachne mucronata* tussock grassland;

H5a

Eucalyptus socialis subsp. *eucentrica* low open woodland over mixed scattered shrubs to shrubland over *Triodia wiseana* hummock grassland;

H6a

Acacia pruinocarpa scattered low trees over mixed *Acacia* spp. scattered shrubs over *Triodia epactia* hummock grassland;

H6b

Acacia pruinocarpa low woodland over *Eremophila* scattered shrubs to shrubland over *Triodia epactia* hummock grassland;

H6c

Acacia pruinocarpa scattered trees over *Senna* spp. scattered shrubs to shrubland over *Triodia longiceps* hummock grassland;

H7a

Acacia pruinocarpa low woodland over mixed scattered shrubs to shrubland over mixed *Triodia epactia* hummock / mixed tussock grassland;

H8a

Acacia aneura and *Acacia pruinocarpa* low woodland over mixed *Eremophila* shrubland over *Triodia pungens* hummock grassland;

H9a

Mixed *Acacia* spp. scattered shrubs to shrubland over *Triodia epactia* hummock grassland;

H9b

Mixed *Acacia* spp. scattered shrubs to shrubland over *Triodia wiseana* hummock grassland;

H9c

Mixed *Acacia* spp. scattered shrubs to shrubland over *Triodia brizoides* hummock grassland;

H9d

Mixed *Acacia* spp. scattered shrubs to shrubland over *Triodia longiceps* hummock grassland;

H10a

Mixed *Senna* spp. scattered shrubs over *Triodia epactia* hummock grassland;

H10b

Mixed *Senna* spp. scattered shrubs to shrubland over *Triodia brizoides* / *Triodia epactia* hummock grassland;

H10c

Mixed *Senna* spp. scattered shrubs over *Triodia wiseana* hummock grassland;

H12a

Mixed *Triodia epactia* hummock / *Eriachne*. spp tussock grassland;

D1a

Corymbia hamersleyana scattered trees over mixed *Acacia* spp. scattered shrubs to shrubland over *Triodia epactia* hummock grassland;

D2a

Corymbia hamersleyana scattered low trees to low woodland over mixed *Acacia* spp. scattered shrubs to shrubland over mixed *Triodia epactia* hummock / *Cenchrus* spp. tussock grassland;

D2b

Corymbia hamersleyana scattered low trees over mixed *Acacia* spp. shrubland over mixed *Triodia epactia* hummock / *Paraneurachne muelleri* tussock grassland;

D3a

Corymbia hamersleyana scattered trees over scattered mixed shrubs over mixed *Cymbopogon ambiguus* tussock grassland / *Cyperus vaginatus* sedgeland;

D5a

Eucalyptus leucophloia scattered trees over mixed *Acacia* spp. shrubland over *Triodia epactia* hummock grassland;

D5b

Eucalyptus leucophloia scattered trees over mixed *Acacia* spp. shrubland over *Triodia longiceps* hummock grassland;

D6a

Eucalyptus victrix woodland over *Melaleuca* spp high shrubland over mixed *Triodia epactia* hummock / *Cenchrus* spp. tussock grassland / *Cyperus vaginatus* sedgeland;

D6b

Eucalyptus victrix woodland over *Melaleuca* spp high shrubland over mixed *Triodia longiceps* hummock / *Cenchrus* spp. tussock grassland / *Cyperus vaginatus* sedgeland;

D6c

Eucalyptus victrix woodland over mixed *Acacia* spp shrubland over mixed *Triodia longiceps* hummock / *Cenchrus* spp. tussock grassland;

D6d

Eucalyptus victrix / *Acacia ampliceps* woodland over mixed shrubland over *Triodia longiceps* hummock / *Cenchrus* spp. tussock grassland;

D6e

Eucalyptus victrix scattered trees to woodland over mixed *Cullen leucanthum* high shrubland over mixed *Triodia longiceps* hummock / *Cenchrus* spp. tussock grassland / *Cyperus vaginatus* sedgeland;

D7a

Eucalyptus victrix woodland over mixed *Acacia* spp shrubland over *Cenchrus ciliaris* tussock grassland;

D8a

Mixed *Acacia* spp. shrubland over *Triodia epactia* hummock grassland;

D8b

Mixed *Acacia* spp. shrubland over *Triodia longiceps* hummock grassland;

D11a

Acacia inaequilatera scattered shrubs over *Triodia epactia* hummock grassland / *Cyperus vaginatus* sedgeland;

D13a

Mixed *Grevillea pyramidalis* subsp. *leucadendron* shrubland over *Cenchrus ciliaris* tussock grassland / herbland;

D14a

Cullen leucanthum shrubland;

D15a

Mixed *Typha domingensis* sedgeland;

D16a

Mixed *Cenchrus* spp. tussock grassland;

P1a

Mixed scattered shrubs over *Triodia epactia* hummock grassland;

P2a

Mixed *Aristida contorta* tussock grassland / *Sclerolaena costata* herbland;

PC1a

Mixed scattered shrubs over mixed herbland and mixed *Dichanthium sericeum* subsp. *humilius* tussock grassland;

PC1b

Mixed low shrubs over *Ptilotus gomphrenoides* herbland and mixed *Panicum laevinode* open tussock grassland; and

P_c3a

Acacia synchronicia scattered shrubs over mixed *Aristida contorta* tussock grassland / scattered *Triodia epactia* / herbland.

Clearing Description

BC Iron (2010) has applied to clear up to 450.3 hectares within an application area totalling approximately 2086 hectares (GIS Database). The application area is located approximately 19 kilometres south-east of Nullagine (GIS Database).

The application is for the establishment of a new mine site that includes the construction of several mining areas, waste dumps, accommodation camp, borrow pits, access roads and haul roads (Strategen, 2010a). Clearing will be by mechanical means.

Vegetation Condition

Pristine: No obvious signs of disturbance (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 Astron Environmental Services (2008). The vegetation within the survey area has been impacted by grazing, fire and weed infestations (Astron Environmental Services, 2008).

Clearing permit CPS 3723/1 was granted by the Department of Mines and Petroleum on 1 July 2010 and was valid from 31 July 2010 to 31 July 2020. The clearing permit authorised the clearing of 450.3 hectares within an area of approximately 2086 hectares. The proponent has requested the reporting date be changed from 31 July to 31 October. This change will also result in the duration of the permit being extended to 31 October 2020. The amount authorised to clear and the clearing permit boundary will remain the same.

3. Assessment of application against clearing principles

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

Comments

Proposal is at variance to this Principle

The application area is located within the Chichester subregion of the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). CALM (2002) reports that high species and ecosystem diversity is focussed around hummock grasslands which host reptile and small mammal communities, and around the cracking clay communities of the Chichester Range and Mungaroona Range.

Four flora and vegetation surveys of an area that included the application area were conducted by Astron Environmental Services across five months from May to September 2008. Astron Environmental Services (2008) identified a total of 462 native vascular flora species representing 172 genera from 58 families. The dominant families were represented by the Grass family (*Poaceae*), Hibiscus family (*Malvaceae*), Pea family (*Papilionaceae*) and the Acacia family (*Mimosaceae*) (Astron Environmental Services, 2008).

Astron Environmental Services (2008) reports that the area is floristically diverse with over 50% of the species recorded being present in only one or two of the surveyed 71 quadrats. The quadrats displaying the highest species richness (and containing infrequently present species) were generally associated with recently burnt areas (Astron Environmental Services, 2008). No Declared Rare Flora or Threatened Ecological Communities have been recorded within the application area (Astron Environmental Services, 2008). Priority Flora species and a Priority Ecological Community were recorded within the application area (Astron Environmental Services, 2008).

Astron Environmental Services (2008) reports that one Priority Ecological Community (PEC), 'Plant Assemblages of the Wona System' (Priority 3), occurs within the application area. The vegetation units that correspond to this PEC are PC1a ('Mixed scattered shrubs over mixed herbland and mixed *Dichanthium sericeum* subsp. *humilius* tussock grassland') and PC1b ('Plains – cracking clay: mixed low shrubs over *Ptilotus gomphrenoides* herbland and open tussock grassland') (Astron Environmental Services, 2008). This PEC is threatened by preferential grazing from cattle and kangaroos (Astron Environmental Services, 2008).

The vegetation type PC1a occurred in small areas and appeared to be a poorly developed cracking clay vegetation, probably because the soils were not the type or extensive enough to develop into extensive cracking clay areas (Astron Environmental Services, 2008). It is the opinion of Astron Environmental Services (2008) that it would be difficult to justify the consideration of this marginal cracking clay unit as PEC vegetation. According to Astron Environmental Services (2008) approximately 1.05 hectares of this vegetation unit (7% of the total vegetation unit) will be disturbed by the proposed clearing.

Astron Environmental Services (2008) reports that approximately 4.69 hectares of vegetation association PC1b (2.8% of the total vegetation unit) will be disturbed by the proposed clearing. Vegetation mapping provided by Astron Environmental Services (2008) indicates that vegetation unit PC1b is fairly well represented throughout the Nullagine area with 167.5 hectares of this vegetation type mapped overall. Given this, the proposed clearing is unlikely to have a significant impact on this PEC.

The Mulga woodland vegetation (vegetation association H8a) was identified by Astron Environmental Services (2008) as being significant. This woodland has been classed as significant as it is an isolated substantial occurrence within the Spearhole land system and is at the northern limit of its known range. Approximately 7.32 hectares of the total 120 hectares (6.1% of the total vegetation unit) mapped for this area will be disturbed by the proposal (Astron Environmental Services, 2008).

The desktop survey has identified eight Priority Flora species that have the potential to occur within the application area (Astron Environmental Services, 2008). Of these, the following three Priority Flora species were identified within the survey area during the field survey (Astron Environmental Services, 2008):

- *Stemodia* sp. Battle Hill (Priority 1);
- *Iotasperma sessilifolius* (Priority 3); and
- *Ptilotus mollis* (Priority 4).

Stemodia sp. Battle Hill was recorded from one location within the application area, and one location just outside of the application area (Astron Environmental Services, 2008). This species was recorded in a depression in a flow line and on the edge of cracking clays (Astron Environmental Services, 2008). There is currently only two other records of this species (Western Australian Herbarium, 2010). Impacts to this species could be managed by the implementation of a flora management condition.

Iotasperma sessilifolius was also recorded at one location within the application area and one location outside the application area (Astron Environmental Services, 2008). This species has been recorded from several locations in the Pilbara and Kimberley from cracking clays and black loams on the edges of waterholes and plains (Western Australian Herbarium, 2010). This species is not expected to be disturbed and Astron Environmental Services (2008) has indicated that it is likely to occur in other cracking clay areas in the region.

Ptilotus mollis was recorded from several locations within, and outside of the application area (Astron Environmental Services, 2008). This species was relatively abundant with most locations recording in excess of 100 individuals (Strategen, 2010a). It has been recorded from locations across the Pilbara bioregion and also within the Little Sandy Desert bioregion (Western Australian Herbarium, 2010). Several locations of this species within the application area are expected to be disturbed (Strategen, 2010a). Whilst it will be disturbed, given it is widespread within the local area and bioregion, the impacts are not expected to be significant or affect the conservation status of this species.

There was also two species of regionally significant flora recorded within the application area (Astron Environmental Services, 2008):

- *Vigna* sp. Hamersley Clay; and
- *Eriachne* aff. *festucacea*.

Both of these species appear to be widespread but are considered to be uncommon (Astron Environmental Services, 2008; Western Australian Herbarium, 2010). These species were recorded from cracking clay and the bed and banks of creeks (Astron Environmental Services, 2008). If disturbances to these areas are minimised then impacts on these species will be not be great.

Fifteen weed species were identified within the application area (Astron Environmental Services, 2008). The presence of introduced weed species lowers the biodiversity value of the proposed clearing area. Care must be taken to ensure that the proposed clearing activities do not spread or introduce weed species to non-infested areas. The risk of spreading weed species can be mitigated by imposing a condition for the purpose of weed management.

Bamford Consulting Ecologists (Bamford) conducted fauna surveys of an area that included the application area in June/July 2008 and October 2008. Bamford (2009) recorded a total of 115 fauna species during the field surveys, including one fish, three frogs, 35 reptiles, 62 birds and 14 mammal species. Bamford (2009) reports that this fauna assemblage is typical of the northern Pilbara region, with many species being widespread. However, eight fauna species of conservation significance have been recorded within the survey area (Bamford, 2009).

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

Methodology Astron Environmental Services (2008)
Bamford (2009)
CALM (2002)
Strategen (2010a)
Western Australian Herbarium (2010)
GIS Database:
- IBRA WA (Regions - Subregions)

(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 may be at variance to this Principle

Bamford Consulting Ecologists conducted fauna surveys of an area that included the application area in June/July 2008 and October 2008. These surveys consisted of a desktop survey in addition to field based surveys (Bamford, 2009).

These field surveys identified the following conservation significant fauna within the survey area (Bamford, 2009):

- Pilbara Olive Python (*Liasis olivaceus barroni*) – Vulnerable;
- Australian Bustard (*Ardeotis australis*) – Priority 4;
- Bush Stone-curlew (*Burhinus grallarius*) – Priority 4;
- Rainbow Bee-eater (*Merops ornatus*) - Migratory;
- Star Finch (*Neochima ruficauda subclarescens*) – Priority 4;
- Striated Grasswren (*Amytornis striatus striatus*) – Priority 4;
- Northern Quoll (*Dasyurus hallucatus*) – Endangered; and
- Western Pebble-mound Mouse (*Pseudomys chapmani*) – Priority 4.

Bamford (2009) has mapped the following habitat types within the application area:

Spinifex and grassland plains on loam soil.

This habitat type supports rich reptile fauna and may have populations of a number of significant mammal species (Bamford, 2009). Within the project area this landform / vegetation type is associated with broad, shallow valleys. Bamford (2009) states that the impact to this habitat is expected to be low as only a small proportion of this habitat is expected to be affected through road construction, however, impacts may be more widespread through hydrological changes caused by roads. BC Iron (2010) has a number of management procedures in place, including a surface water management plan, to minimise disturbance to hydrological flows, particularly in sensitive areas. Bamford (2009) states that this habitat type is widespread outside of the project area.

Rocky Hills.

The Chichester Ranges and surrounding areas are comprised of undulating rocky hills which are dissected by small gorges and gullies (Bamford, 2009). These hills are generally vegetated by low grasslands and sparse shrublands and soils consist of a thin gravelly-loam with large areas of exposed rock (Bamford, 2009). Undulating rocky hills are reported by Bamford (2009) as being widespread within the application area and in the general region. Strategen (2010a) reports that this habitat will be the principle habitat affected by the proposal, as this is the primary habitat in which mining will take place. Strategen (2010a) states that of the 9000 hectares of this habitat type in the region, approximately 1200 hectares, or less than 15% of this habitat, will be mined over the next 10 years, with progressive rehabilitation of these areas occurring over this period. Bamford (2009) states that impacts to this habitat may be high at a local level, however, on a regional scale this habitat is well represented.

Gorges and Gullies.

Gorges and gullies are reported by Bamford (2009) as providing the most important habitat. These areas are habitat to the Northern Quoll and Pilbara Olive Python, amongst numerous other fauna species (Bamford, 2009). These landforms are often vegetated by taller shrubs and, in some cases; pools of water may be a significant feature (Bamford, 2009). These pools are only temporary, but provide water for many species and are often used by the Pilbara Olive Python to ambush prey (Bamford, 2009). Field surveys conducted by Bamford (2009) confirm that the Northern Quoll is present within these habitat types.

Strategen (2010a) reports that disturbances to Gorges and Gully habitat are expected to be minimal as the primary mining area does not include this habitat. The following management measures will be implemented to minimise indirect impacts (Strategen, 2010a):

- locating haul roads, camps and waste dumps at a distance to the gorges and gullies;
- preventing vehicle access to these areas;
- informing the workforce of the fauna present and preventing interference;
- managing stormwater runoff to ensure that sediment is trapped prior to entering any drainage lines;
- designing waste dumps and pits to minimise impacts on gorges and gullies taking care to prevent material spillage from the mesa mining panels into the gully areas; and
- investigating the use of conveyor systems to move bulk material across gullies.

Protection of gorge and gully habitat will assist in reducing impacts to the Northern Quoll, Pilbara Olive Python and numerous other fauna species that would utilise these habitats, including bat species. Bamford (2009) states that the significance of impact to this habitat type is high due to the presence of conservation significant species and the restricted extent of this habitat. However, only approximately 1.254 hectares of this habitat type is expected to be impacted by the proposed clearing (Astron Environmental Services, 2008).

Ephemeral drainage lines.

These drainage systems occur on upland areas and across the plains, where they channel water into the major watercourses (Bamford, 2009). Ephemeral drainage lines are often more densely vegetated than surrounding areas, and therefore, act as refugia for some animals and for animals that may forage in surrounding habitats (e.g. many species of birds). Bamford (2009) reports that the significance of impacts to ephemeral drainage lines is moderate to high based on the possibility of conservation significant fauna species being present within this habitat. Bamford (2009) reports that this habitat is well represented on a regional scale.

Major watercourses.

The Bonnie Creek is partially present within the application area as a non-perennial watercourse (GIS Database). This creek is a tributary of the Nullagine River, which is part of the De Grey drainage system (Bamford, 2009). These systems are typified by tall vegetation such as *Eucalyptus* trees and *Acacia* species (Bamford, 2009). The water resources of these systems attract fauna and they act as a major concentration point for many animals including birds and mammals (Bamford, 2009). Consequently, major watercourses are of great ecological significance. Bamford (2009) reports that major watercourses lie outside but downstream of the application area. Bamford (2009) states that the significance of impact to this habitat type is low so long as flows into the Nullagine River are not altered greatly. BC Iron (2010) has a number of management procedures in place to ensure drainage and water quality is not greatly altered, including a surface water management plan.

BC Iron (2010) is committed to minimising impacts to the Northern Quoll. A Northern Quoll management and monitoring plan has been prepared by Strategen (2010b) on behalf of BC Iron. This plan has been approved by the Department of Environment, Water, Heritage and the Arts under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*. Furthermore a Northern Quoll tracking program, to be implemented by BC Iron has been approved under the *EPBC Act 1999*. Given this, it is considered that impacts to the Northern Quoll can be managed and the proposed clearing will not affect the conservation status of this species.

The Western Pebble-mound Mouse generally occurs on gentler slopes of rocky ranges where the ground is covered by stony mulch and vegetated by hard *Spinifex*, often with an overstorey of Eucalypts and scattered shrubs (Van Dyck and Strahan, 2008). Mounds are often sited close to narrow ribbons of *Acacia*-dominated scrub that grow along incised drainage lines (Van Dyck and Strahan, 2008). During the surveys, 72 mounds of this species were found throughout the project area, of which 51 (71%) were active (Bamford, 2008). Of the 51 active mounds, 28 were recorded outside of the application area (Bamford, 2009). The Western Pebblemound Mouse is a fairly widespread species (Van Dyck and Strahan, 2008), and the preferred habitat of this species is widespread locally and regionally (Bamford, 2009). Given the number of mounds located outside of the application area, the proposed clearing is not likely to affect the conservation status of this species.

Subterranean fauna including stygofauna and troglifauna have been recorded within the project area (Bennelongia, 2008). It is reported by Strategen (2010a) that none of the troglifauna species are expected to be restricted to the mining area. Furthermore, Strategen (2010a) states that the project is unlikely to have a significant impact on stygofauna as the mining will take place above the watertable and the drawdown from groundwater abstraction will be highly localised. BC Iron (2010) has a subterranean fauna management plan in place to manage impacts to these fauna species. The clearing of native vegetation is unlikely to have a significant impact on these species.

BC Iron (2010) has a flora, vegetation and habitat management plan and a terrestrial fauna management plan in place to manage impacts to fauna species and significant fauna habitat.

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

Methodology Astron Environmental Services (2008)
 Bamford (2009)
 BC Iron (2010)
 Bennelongia (2008)
 Strategen (2010a)
 Strategen (2010b)
 Van Dyck and Strahan (2008)
 GIS Database:
 - Hydrography, linear

(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). Astron Environmental Services conducted flora surveys over the application area on four separate occasions between May and September 2008. No DRF were recorded during the survey (Astron Environmental Services, 2008).

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

Methodology Astron Environmental Services (2008)
 GIS Database:
 - Declared Rare and Priority Flora List

(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**
 There are no known Threatened Ecological Communities (TECs) within the area applied to clear (GIS Database). Astron Environmental Services (2008) reports that no TECs were identified within the application area during the flora and vegetation survey.

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

Methodology Astron Environmental Services (2008)
 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 Pilbara Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). Shepherd (2009) reports that approximately 99.9% of the pre-European vegetation remains within this bioregion (see table below). The vegetation within the application area has been mapped as the following Beard Vegetation Association (Shepherd, 2009):

- **173:** hummock grasslands, shrub steppe; Kanji over soft Spinifex and *Triodia wiseana* on basalt.

According to Shepherd (2009) approximately 100% of this Beard Vegetation Association remains at both state and bioregional level. Therefore, the area proposed to be cleared is not a 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 – Pilbara	17,804,187	17,794,646	~99.9	Least Concern	~6.3
Beard veg assoc. – State					
173	1,421,376	1,421,376	~100	Least Concern	~4.8
Beard veg assoc. – Bioregion					

173	1,420,793	1,420,793	~100	Least Concern	~4.8
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* 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 - Subregions)

(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

According to available databases there are numerous minor ephemeral watercourses and two major ephemeral watercourses within the application area (GIS Database).

Across the application area, 18 vegetation associations have been identified in the major and minor drainage lines, four of which will not be impacted by the proposed disturbance (Astron Environmental Services, 2008). Strategen (2010a) reports that these vegetation types were predominantly woodland or scattered trees consisting of *Corymbia hamersleyana* or *Eucalyptus* spp. (*Eucalyptus victrix*, *Eucalyptus leucophloia* and *Eucalyptus camaldulensis*) or mixed *Acacia* shrublands. The understorey consisted of mixed shrubs with *Triodia* hummock grassland or *Cenchrus ciliaris* grassland (Strategen, 2010a).

Strategen (2010a) reports that changes to the flow paths or any other modification or interruption to the existing hydrogeological regime have the potential to increase or decrease the volume of water transported. Changes to the flow volumes have the potential to increase erosion and sedimentation, ponding or the development of water shadows (Strategen, 2010a). These factors may affect riparian vegetation and associated habitats (Strategen, 2010a).

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

Strategen (2010a) reports that all the ephemeral creeks that will need to be crossed are small in size and are fed by a very small catchment and therefore, the likelihood of ponding is minor. It is not expected by Strategen (2010a) that any local hydrological conditions will be modified sufficiently to significantly alter any vegetation communities or associated fauna habitats as a result of the proposed project. Strategen (2010a) states that the resource to be mined is located on mesas parallel to a major ephemeral drainage line (Bonnie Creek) which is a tributary of the Nullagine River and the De Grey River. Clearing will not occur near this watercourse and sediment collection devices will be used to ensure that clearing and mining does not add to the sediment load of the creek (Strategen, 2010a). Furthermore, clearing within creek gorge habitat (vegetation units D6b, D7a, D15a and H2a) will be minimal (Strategen, 2010a).

Methodology Astron Environmental Services (2008)
Strategen (2010a)
GIS Database:
- Hydrography, linear

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

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

The application area has been mapped as occurring within the Bonney, Rocklea, Robe, Spearhole and Wona land systems (GIS Database). Van Vreeswyk et al. (2004) reports that these land systems are not generally susceptible to erosion.

Strategen (2010a) reports that changes to the flow paths or any other modification or interruption to the existing hydrological regime have the potential to increase or decrease the volume of water transported. Changes to the flow volumes have the potential to increase erosion and sedimentation, ponding or the development of water shadows (Strategen, 2010a). It is reported by Strategen (2010a) that the majority of the operations are not expected to affect areas that generate overland flow conditions. These areas predominately occur on flat plains whereas the main centre of operations will be located higher in the landscape, on mesas (Strategen, 2010a).

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

Methodology Strategen (2010a)
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

According to available databases, the application area is not located within a conservation area or any DEC managed lands (GIS Database). The nearest conservation reserve is Meentheena Station which is former leasehold land (GIS Database). Meentheena Station is located approximately 67 kilometres north-east of the application area (GIS Database). Based on this distance, the project 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

Strategen (2010a) reports that changes to the flow paths or any other modification or interruption to the existing hydrological regime have the potential to increase or decrease the volume of water transported. Changes to the flow volumes have the potential to increase erosion and sedimentation, ponding or the development of water shadows (Strategen, 2010a).

It is reported by Strategen (2010a) that the majority of the operations are not expected to affect areas that generate overland flow conditions. These areas predominately occur on flat plains whereas the main centre of operations will be located higher in the landscape, on mesas (Strategen, 2010a). Furthermore, as all the ephemeral creeks that will need to be crossed are small in size and are fed by a very small catchment, the likelihood of ponding occurring is minor. Strategen (2010a) has a Surface Water Management Plan in place to manage impacts to surface water quality. A water quality monitoring program will be implemented to ensure surface water is compliant with ANZECC/ARMCANZ surface water quality guidelines (Strategen, 2010a).

Astron Environmental Services (2008) reports that the groundwater is contained within fractures in the basaltic rocks, shales, and iron formations and may be deep below the surface. Recharge is episodic and resultant of direct rainfall infiltration over areas where rocks are fractured, jointed and weathered (Astron Environmental Services, 2008). The groundwater is generally fresh but may be brackish in parts (Astron Environmental Services, 2008). The resource to be mined is reported by Strategen (2010a) as being located above the watertable.

Given the above, the proposed clearing is unlikely to have a significant impact on surface or underground water quality.

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

Methodology Astron Environmental Services (2008)
Strategen (2010a)

(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

There are numerous non-perennial watercourses within the application area (GIS Database).

Natural flooding occurs seasonally in the Pilbara region as a result of cyclonic activity and sporadic thunderstorm activity (Strategen, 2010a). The non-perennial watercourses within the application area would experience natural seasonal flooding from the runoff of surface water during and following significant rainfall events (Strategen, 2010a).

Strategen (2010a) reports that the proposed clearing will not affect water levels or drainage as the majority of the clearing is at a considerable distance (100 metres or more) from drainage channels.

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

Methodology Strategen (2010a)
GIS Database:
- hydrography, linear

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

Comments

Clearing permit CPS 3723/1 was granted by the Department of Mines and Petroleum on 1 July 2010 and was

valid from 31 July 2010 to 31 July 2020. The clearing permit authorised the clearing of 450.3 hectares within an area of approximately 2086 hectares. The proponent has requested the reporting date be changed from 31 July to 31 October. This change will also result in the duration of the permit being extended to 31 October 2020. The amount authorised to clear and the clearing permit boundary will remain the same.

There is one Native Title claim (WC99/016) over the area under application (GIS Database). This claim has been registered with the Native Title Tribunal on behalf of the claimant group. However, the mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process. Therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

According to available databases there are numerous 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.

It is noted that the proposed clearing may impact on a protected matter under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*. The proponent may be required to refer the project to the (Federal) Department of the Environment, Water, Heritage and the Arts (DEWHA) for environmental impact assessment under the *EPBC Act*. The proponent is advised to contact the DEWHA for further information regarding notification and referral responsibilities under the *EPBC Act*.

Methodology GIS Database:
- Aboriginal Sites of Significance
- Native Title Claims

4. References

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- Western Australian Herbarium (1998) FloraBase - The Western Australian Flora. Department of Environment and Conservation. <http://florabase.dec.wa.gov.au/>.

5. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government.
CALM	Department of Conservation and Land Management, Western Australia.
DAFWA	Department of Agriculture and Food, Western Australia.
DA	Department of Agriculture, Western Australia.
DEC	Department of Environment and Conservation
DEH	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
DEP	Department of Environment Protection (now DoE), Western Australia.
DIA	Department of Indigenous Affairs

DLI	Department of Land Information, Western Australia.
DMP	Department of Mines and Petroleum, Western Australia.
DoE	Department of Environment, Western Australia.
DoIR	Department of Industry and Resources, Western Australia.
DOLA	Department of Land Administration, Western Australia.
DoW	Department of Water
EP Act	Environment Protection Act 1986, Western Australia.
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
GIS	Geographical Information System.
IBRA	Interim Biogeographic Regionalisation for Australia.
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
RIWI	Rights in Water and Irrigation Act 1914, Western Australia.
s.17	Section 17 of the Environment Protection Act 1986, Western Australia.
TECs	Threatened Ecological Communities.

Definitions:

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

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

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

- Schedule 1** **Schedule 1 – Fauna that is rare or likely to become extinct:** being fauna that is rare or likely to become extinct, are declared to be fauna that is need of special protection.
- Schedule 2** **Schedule 2 – Fauna that is presumed to be extinct:** being fauna that is presumed to be extinct, are declared to be fauna that is need of special protection.
- Schedule 3** **Schedule 3 – Birds protected under an international agreement:** being birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction, are declared to be fauna that is need of special protection.
- Schedule 4** **Schedule 4 – Other specially protected fauna:** being fauna that is declared to be fauna that is in need of special protection, otherwise than for the reasons mentioned in Schedules 1, 2 or 3.

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

- P1** **Priority One: Taxa with few, poorly known populations on threatened lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P2** **Priority Two: Taxa with few, poorly known populations on conservation lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P3** **Priority Three: Taxa with several, poorly known populations, some on conservation lands:** Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under

immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

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

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

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

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

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

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

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

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

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