



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 7440/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Beatons Creek Gold Pty Ltd

1.3. Property details

Property: Mining Lease 46/09
Mining Lease 46/10
Mining Lease 46/11
Local Government Area: Shire of East Pilbara
Colloquial name: Paleoplacer Gold Project

1.4. Application

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

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 9 March 2017

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

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

- 173:** Hummock grasslands, shrub steppe; kanji over soft spinifex & *Triodia wiseana* on basalt; and
190: Hummock grasslands, sparse shrub steppe; *Acacia bivenosa* & *A. trachycarpa* over hard spinifex, *Triodia wiseana*, Very poor rocky country on gneiss.

A Level 2 Flora and Vegetation Survey of the application area was undertaken by MMWC Environmental Pty Ltd (MMWC) during the period 2 - 9 September 2014 (MWH, 2015). The flora survey identified the following eleven vegetation units in the application area:

Drainage Habitat

- EcTsp:** Low open woodland of *Eucalyptus camaldulensis* subsp. *refulgens* over sedgeland of *Typha domingensis*;
- EIAtGwAmTe:** Scattered low trees of *Eucalyptus leucophloia* subsp. *leucophloia* over high open shrubland open shrubland of *Acacia tumida* var. *pilbarensis*, *Grevillea wickhamii* subsp. *hispidula* and *Acacia monticola* over open hummock grassland of *Triodia epactia*;
- EICHAtGwlmAsTe:** Low open woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana* over closed scrub of *Acacia tumida* var. *pilbarensis* and *Grevillea wickhamii* subsp. *hispidula* over scattered shrubs of *Indigofera monophylla* over scattered low shrubs of *Acacia spondylophylla* over open hummock grassland of *Triodia epactia*;
- EIEvAtTeCi:** Scattered *Eucalyptus leucophloia* subsp. *leucophloia* and *Eucalyptus victrix* over open shrubland of *Acacia tumida* var. *pilbarensis* over very open hummock grassland of *Triodia epactia* over scattered sedges of *Cyperus ixiocarpus*;
- EIMgAtTe:** Scattered low trees of *Eucalyptus leucophloia* subsp. *leucophloia* over high open shrubland of *Melaleuca glomerata* over open shrubland of *Acacia tumida* var. *pilbarensis* over very open hummock grassland of *Triodia epactia*;
- EIMgTeGICa:** Low open woodland of *Eucalyptus camaldulensis* subsp. *refulgens* over high open shrubland of *Melaleuca glomerata* over very open herbland of *Goodenia lamprosperma* and *Chrysocephalum apiculatum*.

Flood Plain Habitat

- EICHAtGwlmWvTe:** Scattered low trees of *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana* over high open shrubland of *Acacia tumida* var. *pilbarensis* and *Grevillea wickhamii* subsp. *hispidula* over open shrubland of *Indigofera monophylla* and *Waltheria virgata* over open hummock grassland of *Triodia epactia*.

Stony Plain Habitat

- AsyAbTITe:** Scattered shrubs of *Acacia synchronicia* (broad leaf form) and *Acacia bivenosa* over open hummock grassland of *Triodia longiceps* and *Triodia epactia*,

Hills Habitat:

9. **EIAaAoAhTbTe:** Scattered low trees of *Eucalyptus leucophloia* subsp. *leucophloia* over scattered tall shrubs of *Acacia aphanoclada* over scattered low shrubs of *Acacia orthocarpa* and *Acacia hilliana* over open hummock grassland of *Triodia brizoides* and *Triodia epactia*;
10. **EIAbTeTb:** Scattered low trees of *Eucalyptus leucophloia* subsp. *leucophloia* over scattered shrubs of *Acacia bivenosa* over hummock grassland of *Triodia epactia* and *Triodia brizoides*;
11. **EIAoAsAhTbTe:** Scattered low trees of *Eucalyptus leucophloia* subsp. *leucophloia* over low open shrubland of *Acacia orthocarpa*, *Acacia spondylophylla* and *Acacia hilliana* over open hummock grassland of *Triodia brizoides* and *Triodia epactia*.

Clearing Description	Paleoplacer Gold Project. Beatons Creek Gold Pty Ltd (BCG) proposes to clear up to 100 hectares of native vegetation within an application area of approximately 389.5 hectares for the purposes of mineral production. The project is located approximately 1 kilometre north-west of Nullagine within the Shire of East Pilbara.
Vegetation Condition	Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994) to Completely Degraded: No longer intact; completely/almost completely without native species (Keighery, 1994).
Comment	The application area consists of large areas of previously disturbed vegetation (approximately 94.92 hectares or 8.17%) of the flora survey area. The application area has been disturbed by historical exploration and prospecting activities. The primary resource area overlaps the previously disturbed areas (MMWC, 2015).

3. Assessment of application against clearing principles

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

Comments	<p>Proposal is not likely to be at variance to this Principle</p> <p>The application area is located within the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion in which approximately 99.58% of the pre-European extent of vegetation remains in Western Australia (Government of Western Australia, 2015; GIS Database). This region comprises undulating Archaean granite and basalt plains and ranges (CALM, 2002). The area supports a shrub steppe characterised by <i>Acacia inaequilatera</i> over <i>Triodia wiseana</i> hummock grasslands, while <i>Eucalyptus leucophloia</i> tree steppes occur on ranges (CALM, 2002). The vegetation of the Pilbara bioregion is well represented in Western Australia and is considered to be of 'least concern' with regards to conservation status (Department of Natural Resources and Environment, 2002).</p> <p>A flora survey of the broader Beatons Creek Gold project (survey area of 1,172.17 hectares) was undertaken by MMWC in 2014. The Level 2 Flora and Vegetation survey identified a total of 173 taxa, representing 43 families and 91 genera in the broader Beaton's Creek Gold project area (MMWC, 2015). However, within the Paleoplacer Gold application area, a reduced number of taxa would be present. No Threatened flora species were recorded during the flora survey. However, three Priority Flora species were recorded during the flora survey including; <i>Acacia aphanoclada</i> (Priority 1), <i>Acacia cyperophylla</i> var. <i>omearana</i> (Priority 1) and <i>Ptilotus wilsonii</i> (Priority 1) (MMWC, 2015). <i>A. aphanoclada</i> occurred primarily in hill habitat (vegetation unit 9, EIAaAoAhTbTe) and 1,686 individuals were recorded in the flora survey area (MMWC, 2015). 360 Environmental (2017) report the majority of this species are located outside of the application area (360 Environmental, 2017). There are 40 records of <i>A. aphanoclada</i> within the Mosquito Land System (DPaW, 2017). <i>A. aphanoclada</i> is common, abundant and widespread on hills and occasionally flats in the Mosquito Land System.</p> <p><i>A. cyperophylla</i> var. <i>omearana</i> occurred in hill habitat (vegetation unit 11, EIAoAsAhTbTe) at the southern boundary of the flora survey area (MMWC, 2015). Only three individuals of <i>A. cyperophylla</i> var. <i>omearana</i> were recorded during the flora survey (MMWC, 2015). No <i>A. cyperophylla</i> var. <i>omearana</i> individuals were recorded in the application area (360 Environmental, 2015; MMWC, 2015).</p> <p><i>P. wilsonii</i> occurred in hill habitat (vegetation units 11, EIAoAsAhTbTe and 10 EIAbTeTb) at the southern boundary of the flora survey area (MMWC, 2015). Two individuals of <i>P. wilsonii</i> were recorded during the flora survey and only three records are known in the Nullagine region (DPaW, 2017). 360 Environmental (2017) confirmed the two <i>P. wilsonii</i> individuals will not be impacted by the proposal (360 Environmental, 2017).</p> <p>Three introduced flora species (weeds) were recorded within the application area, including <i>Averva javanica</i> (Kapok Bush), <i>Calotropis procera</i> (Rubber Tree) and <i>Cenchrus ciliaris</i> (Buffel Grass) (MMWC, 2015). Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.</p> <p>No Threatened Ecological Communities (TEC's) occur within the application area (MMWC, 2015; GIS Database). However, the Priority Ecological Community (PEC), Stony Saline Plains of the Mosquito Land System (Priority 3) occurs in the application area (MMWC, 2015). The PEC is represented by stony plain spinifex grassland with chenopods and is described by Van Vreeswyck <i>et al</i> (2004) as patchy hummock grasslands of <i>Triodia longiceps</i> with isolated to scattered shrubs; <i>Acacia</i>, <i>Senna</i> and <i>Maireana</i> spp. (Van</p>
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Vreeswyk et al., 2004). The PEC covers a large area of the Mosquito Land System (approximately 46,000 hectares or 25% of the land system).

Approximately 146 hectares (or 0.08%) of the Stony Saline Plains PEC was mapped during the flora survey (MMWC, 2015). The PEC occurs in the south-eastern portion of the application area. Only a small portion of the south-eastern clearing area extends into the PEC area. The vegetation in this part of the application area is completely degraded in condition from historical exploration and prospecting activities (MMWC, 2015; GIS Database). MMWC (2015) confirmed the application area where the PEC is located has been significantly eroded from past disturbance and contains little or no ground cover across a large area. Given the vegetation within this PEC area has been previously disturbed, the PEC is extensive within the Mosquito Land System and is well represented outside of the application area, it is unlikely that the proposed clearing will have a significant impact on the PEC.

A desktop survey of the application area identified 259 fauna species potentially occurring within the application area (360 Environmental, 2015). However, the on-site fauna survey recorded a small number species including reptiles, (22 species), birds (29 species) and mammals (14 species) (360 Environmental, 2015).

Roosting and foraging habitat was identified in the application area for the Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia* - Vulnerable) (360 Environmental, 2015). No caves or maternity roost sites occur in the application area. Pilbara Leaf-nosed Bats were recorded at one, old, mine adit in the application area. The disused mine adit is used as a transitory day roost site for some individuals moving through the area (360 Environmental, 2015). The adit is not deep or extensive and large areas of roosting habitat are located in the surrounding area (360 Environmental, 2015).

Foraging habitat for this species is also located in the application area (360 Environmental, 2015). Ridges, creeklines and drainage line habitat are used for foraging and dispersal by the Pilbara Leaf-nosed Bat (360 Environmental, 2015). This habitat type consists of a small portion of the application area (360 Environmental, 2015). It is unlikely the proposed clearing will have a significant impact on the species as large amounts of similar roosting and foraging habitat are located nearby. Pilbara Leaf-nosed Bat calls were also detected at many sites across a 20 kilometre radius around the fauna survey area (360 Environmental, 2015).

Suitable foraging and dispersal habitat for the Black-lined Ctenotus (*Ctenotus nigrilineatus* - Priority 1) was recorded in the application area (360 Environmental, 2015). Drainage line habitat which contains exposed rock, crevices, hollow logs, leaf litter and greater vegetation cover are used by Black-lined Ctenotus individuals. 360 Environmental (2015) considered the drainage line habitat to be of the highest value for fauna species. However, extensive areas of foraging and dispersal habitat are well represented in the surrounding area (GIS Database).

The vegetation in the surrounding area is well represented and the habitat features present do not support a high level of fauna diversity (Government of Western Australia, 2015). For these reasons, it is unlikely the proposal will result in the clearing of native vegetation that has higher biodiversity values than the surrounding, undisturbed vegetation.

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

360 Environmental (2017)
CALM (2002)
Department of Natural Resources and Environment (2002)
DPaW (2017)
Government of Western Australia (2015)
MMWC (2015)
Van Vreeswyk et al. (2004)

GIS Database:
- Threatened Fauna
- Threatened and Priority Flora
- TEC/PEC – Buffer
- TEC/PEC – Boundaries

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

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

A Level 2 fauna survey was conducted over the application area. Based on the results of this survey the following four broad habitat types have been identified in the application area (360 Environmental, 2015):

1. Drainage Line;
2. Hill;
3. Dam; and
4. Degraded Mining Area.

The most widespread fauna habitat type of the survey area consists of hill habitat (920.31 hectares or 78.51% of the survey area) and the least widespread fauna habitat consists of the dam (18.29 hectares or 1.56% of the survey area) (360 Environmental, 2015). The hill habitat comprises *Eucalyptus leucophloia* and *Corymbia hamersleyana* scattered trees over *Acacia hilliana*, *A. orthocarpa* and *A. spondylophylla* over *Triodia brizoides* and *Triodia epactia* (360 Environmental, 2015). The majority of the proposed clearing will target hilltops in the application area where gold-bearing reefs are present (360 Environmental, 2017).

A search of available biological databases was undertaken and no Threatened fauna were recorded in the application area (GIS Database). A desktop survey of fauna species potentially occurring in the region was undertaken prior to the fauna survey (360 Environmental, 2015). The desktop survey recorded 27 fauna species of conservation significance potentially occurring within the application area.

A Level 2 fauna survey was undertaken in August 2014 of the broader Beatons Creek Project Area (360 Environmental, 2015). The fauna survey recorded 22 reptile species, 29 bird species and 14 mammal species in survey area (360 Environmental, 2015). There were five species of conservation significant fauna recorded during the fauna survey (360 Environmental, 2015). These species include:

- Northern Quoll (*Dasyurus hallucatus*) - Endangered
- Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*) - Vulnerable
- Rainbow Bee-Eater (*Merops ornatus*) - Marine
- Black-lined Ctenotus (*Ctenotus nigrilineatus*) - Priority 1
- Western Pebble-mound Mouse (*Pseudomys chapmani*) - Priority 4

One Northern Quoll (*Dasyurus hallucatus* – Endangered) individual was recorded in the fauna survey area in drainage line habitat (360 Environmental, 2015). Northern Quolls occur in a diversity of habitats in the Pilbara including rocky areas, Eucalypt forest and woodlands, shrubland, grassland, desert, gorge, breakaway and major drainage line habitat (DotEE, 2017a). 360 Environmental (2015) confirmed the habitat in the application area contains few rock piles and outcropping which could be used for denning by Northern Quolls. Drainage line habitat also did not contain trees with suitable sized hollows which could be used by the species and it is unlikely this species would depend on the application area due to the species' large home range (360 Environmental, 2015; DotEE, 2017a). The application area is not considered to be core habitat for the species and it is unlikely that Northern Quolls would rely on the area.

360 Environmental (2015) reported the Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia* - Vulnerable) at two locations at old mine adits within the fauna survey area (360 Environmental, 2015). Pilbara Leaf-nosed Bat calls were detected at many sites across a 20 kilometre radius around the fauna survey area (360 Environmental, 2015). The ridges and creeklines in the vicinity of the application area provide foraging habitat for this species (Bat Call WA, 2015). These foraging habitats include the Nullagine River and tributaries of Bonnie, Beatons, Five Mile and Middle Creeks (Bat Call WA, 2015). The drainage line habitat is used for foraging and dispersal by the Pilbara Leaf-nosed Bat (360 Environmental, 2015). However, this habitat type consists of a small portion (5.03%) of the application area (360 Environmental, 2015).

Suitable roosting habitat for Pilbara Leaf-nosed Bats is described as caves, mine adits or deep underground structures that contain, warm, moist and humid microclimates (DotEE, 2017b). No caves or maternity roost sites occur in the application area (360 Environmental, 2015). The application area contained one, disused mine adit where Pilbara Leaf-nosed Bat individuals were recorded (360 Environmental, 2015). The mine adit is used as a transitory day roost site for some individuals moving through the area (360 Environmental, 2015). The adit is not deep or extensive and large areas of roosting habitat are located in the surrounding area (360 Environmental, 2015).

Approximately 20 Rainbow Bee-eater (*Merops ornatus* – Marine) individuals were recorded during the fauna survey (360 Environmental, 2015). The application area contains suitable foraging habitat (shrublands and woodlands) and a permanent water source at the dam located to the east of the application area (360 Environmental, 2015). Rainbow Bee-eaters are highly mobile and widely distributed around Australia, therefore the application area is not considered to be significant habitat for the species (DotEE, 2017c).

The Black-lined Ctenotus (*Ctenotus nigrilineatus* - Priority 1) was recorded in the survey area (360 Environmental, 2015). Black-lined Ctenotus individuals were recorded in hill and drainage line habitat during the survey (360 Environmental, 2015). The drainage line habitat which contains exposed rock, crevices, hollow logs, leaf litter and greater vegetation cover are used by Black-lined Ctenotus individuals for foraging and dispersal. The hill habitat also contains cracks and crevices which are important shelter sites for reptile species (360 Environmental, 2015). There are 19 records of this species in the Nullagine area and given that extensive hill and drainage habitat exists in the survey and surrounding area, the proposed clearing is not expected to have a significant impact habitat for this species (360 Environmental, 2015; DPaW, 2017b).

The Western Pebble-mound Mouse (*Pseudomys chapmani* - Priority 4) was recorded on one occasion within the application area (360 Environmental, 2015). Two disused mounds used by this species were also found during the fauna survey (360 Environmental, 2015). This species most commonly utilises hill habitat and slopes that are covered in small pebbles where individuals construct extensive pebble mounds formed on gentle slopes (360 Environmental, 2015). Similar habitat for this species is common throughout the Pilbara bioregion and large areas of suitable habitat are located adjacent to the application area. The proposed clearing is not expected to have a significant impact on habitat for the Western Pebble-mound Mouse as the proposed clearing is small when compared to the large amount of suitable habitat located in the Pilbara region for this

species (360 Environmental, 2015).

The Paleoplacer project was assessed for impacts to subterranean fauna or fauna habitat. Potential impacts from clearing activities are unlikely to impact subterranean fauna. The assessment determined that stygofauna and troglofauna are likely to occur within the regionally extensive Mosquito Creek Formation (MCF) (KCB, 2015). The results from the assessment considered that potential impacts to subterranean fauna or habitat were low as subterranean fauna are present within the regionally extensive and interconnected MCF and species are not restricted in distribution (KCB, 2015). Mining will not occur in fractured rock and the majority of mining activity will occur from 10 metres of the ridge surface (no deeper than 20 metre vertical depths).

The area proposed to be cleared does not contain significant habitat for fauna species indigenous to Western Australia.

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

Methodology 360 Environmental (2015)
Bat Call WA (2015)
DotEE (2017a)
DotEE (2017b)
DotEE (2017c)
KCB, (2015)

GIS Database:
- Threatened Fauna

(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

A search of available databases was undertaken and no Threatened flora have been recorded in the application area (GIS Database). A flora survey was also undertaken by MMWC in 2014 which did not record species of Threatened flora in the application area (MMWC, 2015). The native vegetation proposed to be cleared is not likely to contain or is not necessary for the continued existence of rare flora.

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

Methodology MMWC (2015)

GIS Database:
- Threatened and Priority Flora

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

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

According to available databases, there are no Threatened Ecological Communities (TEC's) occurring within or near the application area (GIS Database). MMWC (2015) reported no vegetation communities considered to be a TEC within or near the application area as a result of the flora survey.

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

Methodology MMWC (2015)

GIS Database:
- TEC/PEC - Buffers
- TEC/PEC - Boundaries

(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 Interim Biogeographic Regionalisation of Australia (IBRA) bioregion in which approximately 99.58% of the pre-European extent of vegetation remains in Western Australia (refer to table below) (Government of Western Australia, 2015; GIS Database). As large areas of the pre-European extent of native vegetation remain within the Pilbara IBRA region, the vegetation is considered to be of 'least concern' with regards to conservation status (Department of Natural Resources and Environment, 2002).

The native vegetation located in the application area has been mapped as Beard vegetation associations 173; hummock grasslands, shrub steppe; kanji over soft spinifex & *Triodia wiseana* on basalt and 190; Hummock grasslands, sparse shrub steppe; *Acacia bivenosa* & *A. trachycarpa* over hard spinifex, *Triodia wiseana*, very

poor rocky country on gneiss (GIS Database). These vegetation associations have not been extensively cleared as over 99% of the vegetation associations remain at the State level and bioregional levels (refer to table below) (Government of Western Australia, 2015).

The clearing of vegetation as part of the proposal is not part of a significant ecological linkage. The area proposed to be cleared is also not considered to be significant as a remnant in an area that has been extensively cleared (GIS Database). The majority of the vegetation in the application area is considered to be in excellent condition and for these reasons the clearing of native vegetation is not at variance to this Principle (MMWC, 2015).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in All DPaW Managed Land
IBRA Bioregion – Pilbara	17,808,657	17,733,583	99.58	Least Concern	10.12
Beard veg assoc. – State					
173	1,753,104	1,748,260	99.72	Least Concern	13.62
190	169,199	169,050	99.91	Least Concern	NA
Beard veg assoc. – Bioregion					
173	1,752,520	1,747,677	99.72	Least Concern	13.62
190	169,199	169,050	99.91	Least Concern	NA

* Government of Western Australia (2015)

** Department of Natural Resources and Environment (2002)

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

Methodology Department of Natural Resources and Environment (2002)
Government of Western Australia (2015)
MMWC (2015)

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

The application area is located west of the Nullagine River, a major, ephemeral watercourse in the Nullagine area (GIS Database). A minor, ephemeral watercourse is located in the south-western portion of the application area and is a minor tributary which flows south into the Nullagine River (GIS Database).

The proposal requires the clearing of riparian vegetation within drainage and floodplain habitat for the purpose of mineral exploration (MMWC, 2015; GIS Database). The vegetation associated with this habitat type is representative of vegetation units 1, 2, 3, 4, 5, 6 and 7 (MMWC, 2015).

The application area supports riparian vegetation that is growing in, or in association with a watercourse including the flora species; *Eucalyptus camaldulensis* subsp. *refulgens*, *Typha domingensis*, *Acacia tumida* var. *pilbarensis*, *Grevillea wickhamii* subsp. *hispidula*, *Acacia monticola*, *Triodia epactia*, *Corymbia hamersleyana*, *Indigofera monophylla*, *Acacia spondylophylla*, *Eucalyptus victrix*, *Cyperus ixiocarpus*, *Melaleuca glomerata* *Eucalyptus camaldulensis* subsp. *refulgens*, *Melaleuca glomerata*, *Goodenia lamprosperma* and *Waltheria virgata* (DPaW, 2017; MMWC, 2015). These species occur along creeks, creek banks, gullies, river beds, riverine flats, watercourses, seasonally wet areas, drainage lines or floodplains (DPaW, 2017). The potential impacts to riparian vegetation may be minimised through the implementation of a vegetation management condition.

The amount of drainage and floodplain habitat that was mapped during the flora survey (approximately 57.07 hectares or 3.9% of the flora survey area) is small when compared to the remaining stony plain and hills habitat (approximately 1,010 hectares) (MMWC, 2015). The majority of vegetation clearing needed as part of the proposal occurs on hill habitat (360 Environmental, 2017). The area of riparian vegetation within the application area proposed to be cleared is smaller than the area mapped as drainage and floodplain habitat during the flora survey (MMWC, 2015). Therefore, clearing associated with the proposal is not likely to significantly impact the ecological or hydrological functions of the minor, watercourse or major river habitats. The proposed clearing will not have a detrimental impact on vegetation units located in the area.

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

Methodology 360 Environmental (2017)
DPaW (2017)
MMWC (2015)

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 is mapped as the Capricorn and Mosquito land systems (360 Environmental, 2017; Van Vreeswyk et al., 2004; GIS Database). The majority of the application area occurs within the Capricorn land system which consists of Hills and ridges of sandstone and dolomite supporting shrubby hard and soft spinifex grasslands (Van Vreeswyk et al., 2004). The steep, rocky upper slopes, gently sloping stony footslopes and stony lower planes and valleys within the land system are resistant to erosion (Van Vreeswyk et al., 2004).

The Mosquito land system consists of stony plains and prominent ridges of schist and other metamorphic rocks supporting hard spinifex grasslands (Van Vreeswyk et al., 2004). Past and present mining activity on the Mosquito land system has resulted in localised disturbance and degradation (Van Vreeswyk et al., 2004). However, the Mosquito land system is not susceptible to soil erosion with the exception of some drainage floors which are moderately susceptible to erosion if vegetation is removed (Van Vreeswyk et al., 2004).

Northcote, et al (1960-68) describe the landforms in the application area as steep hills and low ranges associated with rocks of dolomite, chert breccia, folded quartzites, shales and slates with extensive areas of rock exposures. Dominant soils are shallow, stony, earth loams (Northcote et al; 1960-1968).

It is unlikely that the clearing of native vegetation clearing required for the proposal will change salinity levels, impact nutrient export or soil acidification (360 Environmental, 2017). It is also unlikely that the proposal will cause waterlogging, flooding or large scale land degradation in the area.

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

Methodology 360 Environmental (2017)
Northcote et al. (1960-68)
Van Vreeswyk et al. (2004)

GIS Database:
- Hydrography, linear
- 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 at variance to this Principle

The application area does not lie within any conservation areas or Department of Parks and Wildlife managed lands (360 Environmental, 2017; GIS Database). The nearest conservation area is Karijini National Park which is located approximately 148 kilometres south-west of the application area (GIS Database). As this conservation area is located a considerable distance from the application area, the proposed clearing is not likely to have any impacts on the environmental values of adjacent or nearby conservation areas.

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

Methodology 360 Environmental (2017)

GIS Database:
- DPaW 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

The application area falls within a Public Drinking Water Source Area (Priority 1), Nullagine Water Reserve (GIS Database). To ensure the protection of water resources, the Department of Water (DoW) advised all activities within the water reserve should be conducted in accordance with the Nullagine Water Reserve Water Source Protection Plan (DoW, 2017). The DoW also advised that all clearing activities associated with the proposal including infrastructure, laydown areas, refuelling and topsoil storage should be compatible with the DoW's Land Use Compatibility Tables. Mining activities should also be managed using current best practice and comply with the DoW's Water Quality Protection Notes and Guidance (DoW, 2017).

The groundwater within the application area is between 7000 – 14,000 milligrams per litre of Total Dissolved Solids (TDS) which is considered to be brackish-saline water (GIS Database). It would not be expected that the proposed clearing of 100 hectares within a permit boundary of 389.5 hectares would cause salinity levels within the application or surrounding area to alter. No changes to the pH of groundwater are expected as a result of the clearing.

The proposed clearing is unlikely to cause deterioration in the quality of surface water including erosion or eutrophication of water bodies on-site or off-site.

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

Methodology DoW (2017)

GIS Database:

- Groundwater Salinity, Statewide
- Hydrography, linear
- Public Drinking Water Source Areas

(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**

Mean annual rainfall for the nearest weather station located at Noreena Downs recorded 324.1 millimetres and total average annual evaporation for the area is 3,200 millimetres (BoM, 2017). As the application area receives low rainfall and annual evaporation is high, there is likely to be little surface flow during normal seasonal rains (BoM, 2017).

The Nullagine River is located approximately 600 metres south of the application area and surface water will flow following seasonal rainfall. It is unlikely that the clearing of 100 hectares within an application area of 389.5 hectares will cause or exacerbate the incidence or intensity of localised or regional flooding.

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

Methodology BoM (2017)

GIS Database:

- Hydrography, linear

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

Comments There are two native title claims (WC1999/008, WC 1999/016) over the application area (DAA, 2017). These claims have been registered with the National Native Title Tribunal on behalf of the claimant groups (DAA, 2017). However, the tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the Act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

According to available databases, there is one registered Aboriginal site of significance within the application area (Site ID 6636) (DAA, 2017). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal sites of significance are damaged through the clearing process.

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

The clearing permit application was advertised on 30 January 2017 by the Department of Mines and Petroleum inviting submissions from the public. There were no submissions received.

Methodology DAA (2017)

4. References

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5. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government
DAA	Department of Aboriginal Affairs, Western Australia
DAFWA	Department of Agriculture and Food, Western Australia
DEC	Department of Environment and Conservation, Western Australia (now DPaW and DER)
DotEE	Department of the Environment and Energy, Australian Government
DER	Department of Environment Regulation, Western Australia
DMP	Department of Mines and Petroleum, Western Australia
DRF	Declared Rare Flora
DoW	Department of Water, Western Australia
DPaW	Department of Parks and Wildlife, Western Australia
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DotEE)
EPA	Environmental Protection Authority, Western Australia
EP Act	<i>Environmental Protection Act 1986</i> , Western Australia
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (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
PEC	Priority Ecological Community, Western Australia
RIWI Act	<i>Rights in Water and Irrigation Act 1914</i> , Western Australia
TEC	Threatened Ecological Community

Definitions:

{DPaW (2015) Conservation Codes for Western Australian Flora and Fauna. Department of Parks and Wildlife, Western Australia}:-

T

Threatened species:

Published as Specially Protected under the *Wildlife Conservation Act 1950*, listed under Schedules 1 to 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife

Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora).

Threatened fauna is that subset of 'Specially Protected Fauna' declared to be 'likely to become extinct' pursuant to section 14(4) of the Wildlife Conservation Act.

Threatened flora is flora that has been declared to be 'likely to become extinct or is rare, or otherwise in need of special protection', pursuant to section 23F(2) of the Wildlife Conservation Act.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

- CR Critically endangered species**
Threatened species considered to be facing an extremely high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.
- EN Endangered species**
Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.
- VU Vulnerable species**
Threatened species considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.
- EX Presumed extinct species**
Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora.
- IA Migratory birds protected under an international agreement**
Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice.
- CD Conservation dependent fauna**
Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice.
- OS Other specially protected fauna**
Fauna otherwise in need of special protection to ensure their conservation. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.
- P Priority species**
Species which are poorly known; or
Species that are adequately known, are rare but not threatened, and require regular monitoring. Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.
- P1 Priority One - Poorly-known species:**
Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
- P2 Priority Two - Poorly-known species:**
Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

P3

Priority Three - Poorly-known species:

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

P4

Priority Four - Rare, Near Threatened and other species in need of monitoring:

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable, but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.