



1. Application details

1.1. Permit application details

Permit application No.: 1691/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Sir Samuel Mines NL

1.3. Property details

Property: Mining Lease M37/1275
Miscellaneous License L37/175
Local Government Area: Shire of Leonora
Colloquial name: Sinclair Nickel Project

1.4. Application

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

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 at 1:250000 as Beard Vegetation type 18 (Low Woodland; mulga (*Acacia aneura*)).

Twelve plant communities were identified by Matisse Consulting Pty Ltd (Matisse, 2006) during a flora survey over an area including the application area. These are:

A1 - Low Woodland to Tall Shrubland of *Acacia aneura* var. *intermedia* and *Acacia aneura* var. *aneura* over *Acacia tetragonaphylla* with *Acacia craspedocarpa* and *Santalum lanceolatum* over *Eremophila ?platycalyx*, *Eremophila pustulata*, *Eremophila serrulata*, *Senna artemisioides* ssp. *x artemisioides*, *Senna artemisioides* ssp. *filifolia*, over *Ptilotus obovatus* and *Solanum lasiophyllum*. Found on red sandy clay soils with covering of quartz pebbles in proximity to minor flow lines.

A2 - Low Open Woodland of *Acacia aneura* var. *intermedia* with *Acacia aneura* var. *aneura* over *Acacia rhodophloia*, *Acacia tetragonaphylla*, *Eremophila ?platycalyx*, over *Eremophila forrestii* ssp. *forrestii* (ms), *Senna artemisioides* ssp. *artemisioides*, varieties of *Eremophila* over *Ptilotus obovatus*, *Solanum lasiophyllum* and *Aristida contorta*. Found on red sandy clay soils with overlying pebbles adjacent to community A1.

A3 - Low Open Woodland to Tall Shrubland of *Acacia aneura* var. *aneura* and *Acacia aneura* var. *intermedia* with *Acacia tetragonaphylla* and *Santalum lanceolatum* over *Eremophila ?platycalyx*, *Eremophila forrestii* ssp. *forrestii* (ms), and interchanging varieties of *Senna artemisioides* and *Eremophila* over *Ptilotus obovatus*, *Spartothamnella teucriflora*, *Solanum lasiophyllum* and *Rhagodia ?drummondii*. Found on flat, red sandy clays with overlying gravel.

A4 - Tall Shrubland of *Acacia aneura* var. *aneura* with *Acacia tetragonaphylla* over *Eremophila ?platycalyx*, *Eremophila pustulata*, *Eremophila spectabilis* and *Eremophila serrulata* over dead *Eriachne flaccida* with *Carrichtera annua* (weed species), *Gnephosis tenuissima* and *Eragrostis eriopoda*. Found on red clays in the eastern region of M37/1275.

A5 - Tall Shrubland of *Acacia aneura* var. *intermedia* and *Acacia aneura* var. *aneura* with *Santalum lanceolatum* over *Eremophila forrestii* ssp. *forrestii* (ms), *Eremophila spectabilis* over *Eragrostis eriopoda* and *Dianella revoluta* var. *divaricata*. Found on flat, red sandy clays with a large amount of overlying quartz.

A6 - Tall Open Shrubland of *Acacia aneura* var. *aneura* over *Eremophila galeata* (ms), *Acacia tetragonaphylla*, *Acacia craspedocarpa*, *Eremophila ?platycalyx*, *Eremophila latrobei* ssp. *filiformis* (ms), *Eremophila spectabilis* over *Ptilotus obovatus*, *Ptilotus schwartzii* var. *schwartzii* and *Eragrostis eriopoda*. Found on flat red sandy clays with a large amount of overlying quartz.

A7 - Tall Open Shrubland of *Acacia aneura* var. *intermedia* and *Acacia aneura* var. *aneura* with *Acacia rhodophloia* and *Acacia tetragonaphylla* over *Eremophila spectabilis* with *Senna artemisioides* subsp. *x artemisioides*, *Senna artemisioides* subsp. *filifolia*, *Santalum spicatum*, *Dianella revoluta* var. *divaricata* and interchanging varieties of *Eremophila* over *Ptilotus obovatus*, *Eragrostis eriopoda* and *Solanum lasiophyllum*.

Found on flat red sandy clay soils adjacent to community A1.

A8 - Open Shrubland of *Acacia aneura* var. *aneura* and *Acacia aneura* var. *intermedia* with *Hakea leucoptera* subsp. *sericipes*, *Templetonia egena* and *Eremophila pantonii* over *Ptilotus obovatus*, *Eremophila pustulata*, *Eremophila latrobei* subsp. *filiformis* (ms), *Senna artemisioides* subsp. *helmsii* and *Scaevola spinescens* over *Ptilotus schwartzii* var. *schwartzii*, *Sclerolaena cuneata* and varieties of *Maireana*. Found on mid slopes containing red sandy, gravelly clays with large amount of overlying quartz and ironstone rocks.

A9 - Open Shrubland of *Acacia aneura* var. *intermedia* with *Acacia craspedocarpa* and Dead Old *Acacia* sp. over *Acacia aneura* var. *aneura* and *Senna artemisioides* subsp. *filifolia* over *Ptilotus obovatus*, *Maireana convexa*, *Eragrostis eriopoda*, *Solanum lasiophyllum* and *Sclerolaena cuneata*. Found on flat red sandy clay soils with some overlying ironstone pebbles.

E1 - Low Open Woodland of *Eucalyptus camaldulensis* var. *obtusata* over *Acacia aneura* var. *aneura*, *Hakea lorea* subsp. *lorea*, *Acacia burkittii*, *Acacia tetragonaphylla* and *Acacia aneura* var. *intermedia* over *Eremophila galeata* (ms), other varieties of *Eremophila* and *Senna artemisioides* subsp. *artemisioides* over *Ptilotus obovatus*, *Streptoglossa liatroides*, *Cymbopogon obtectus*, *Solanum lasiophyllum*, *Salvia verbenaca* (weed species) and *Enneapogon caerulescens*. Found on red alluvial sands with gravel on banks of major flow lines.

S1 - Open Shrubland of *Hakea preissii*, *Acacia aneura* var. *aneura*, *Acacia tetragonaphylla* with interchanging varieties of *Acacia* and *Senna artemisioides*, *Eremophila ?platycalyx*, *Eremophila pustulata*, *Cratystylis subspinescens* and *Scaevola spinescens* over *Ptilotus obovatus*, *Sclerolaena cuneata*, *Maireana convexa* and *Enneapogon caerulescens*. Found on flat, red sandy clays with overlying quartz and ironstone rocks.

S2 - Open Shrubland of *Eremophila ?platycalyx* with *Acacia tetragonaphylla* over *Ptilotus obovatus* with *Solanum lasiophyllum*, *Sclerolaena cuneata* and *Cymbopogon obtectus*. Found on barren red clay pans.

Clearing Description	Sir Samuel Mines NL have applied to clear 200 hectares within a 1218 hectare application area for the purpose of creating a nickel mine and associated infrastructure such as waste rock dumps, Tailings Storage Facility (TSF), evaporation ponds, airstrip and camp, as well as a haul road from the site to Leonora Road.
Vegetation Condition	Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery 1994)
Comment	Mattiske (2006) has described the vegetation condition as very degraded near existing drill sites to excellent in less disturbed areas of vegetation. A site visit by the assessing officer, confirmed the vegetation condition as very good to excellent in most areas. The only vegetation of significance on a local scale is that within Cody's Creek, which is important habitat for fauna. Mine infrastructure has been located to avoid disturbance to Cody's Creek.

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 occurs within the Murchison IBRA Bioregion (GIS Database). This Bioregion is noted for its internal drainage and extensive areas of elevated red desert sandplains with minimal dune development. Salt lake systems are associated with the occluded paleodrainage system. Broad plains of red-brown soils and breakaway complexes as well as red sandplains are widespread. Vegetation is dominated by mulga woodlands and is often rich in ephemerals, hummock grasslands, saltbush shrublands and <i>Halosarcia</i> shrublands (CALM, 2002). The application area is largely mulga shrublands with a non-perennial drainage line supporting large <i>Eucalyptus camaldulensis</i> (Mattiske, 2006).</p> <p>The bioregion is rich and diverse in both its flora and fauna but most species are wide ranging and usually occur in adjoining regions (CALM, 2002). No flora species of conservation significance were located within the application area, although several species were noted as extensions of their range (Mattiske, 2006).</p> <p>Within the bioregion, woodlands and shrublands (<i>Acacia</i>, chenopod, <i>Melaleuca</i>, <i>Casuarina</i> and <i>Eucalyptus</i>) and grasslands are generally in fair or good condition and are either declining or show a static trend. All of these communities are threatened by grazing (stock, goats and rabbits) and changed fire regimes (CALM, 2002). The vegetation types within the application area are in similar condition (Mattiske, 2006). The application area is within the Sturt Meadows and Weebo Pastoral Stations and has therefore been subject to grazing pressures. The area is also grazed by feral goats (Matt Dowling, pers obs).</p> <p>More than 40 per cent of the Murchison's original mammalian fauna is now regionally extinct. This is due to competition from other herbivores and predation by foxes and wild dogs (CALM, 2002). The application area contains vegetation that may be habitat for a range of conservation significant fauna species (Biota, 2006).</p> <p>The assessing officer therefore does not consider that the application area is an area of outstanding biodiversity in the local area, or in the bioregion.</p> <p>During an inspection of the application area, the assessing officer noted a lack of understorey species in some areas and considered the vegetation condition to range from 'good' to 'very good' on the Keighery scale (Keighery, 1994). Past mining activity is also present, as well as disturbance from more recent exploration</p>
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activity.

The Biodiversity Coordination Section (BCS) of the Department of Environment and Conservation (DEC) considers that the surveys conducted over the area under application are adequate to enable the assessing officer to conduct the assessment against this principle (DEC, 2007).

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

Methodology Biota (2006)
CALM (2002)
DEC (2007)
Keighery (1994)
Mattiske (2006)
GIS Database:
- Interim Biogeographic Regionalisation of Australia - EA 18/10/00

(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 check of available databases by the assessing officer reveals one record of a Bilby (*Macrotis lagotis*) sighting from 1981, approximately 7 km east of the application area.

In October and November 2006, Biota Environmental Services (Biota) conducted a Level 2 fauna survey over the application area and surrounds. The aim of the survey was to identify fauna habitats, particularly those with conservation significance, document the fauna assemblage, which involved a desktop review of existing data and site specific survey, identify fauna of conservation significance and to provide management advice to mitigate impacts to fauna and habitats of conservation significance (Biota, 2006). The survey and subsequent report adequately meets the requirements of Guidance Statement 56 - 'Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia' (EPA, 2004a).

The habitat types identified by Biota were considered to be disturbed and poor, to highly disturbed and very poor due to lack of understorey, leaf litter and fallen timber, most likely due to overgrazing by sheep and goats. Biota suggest this reflects the low species number in their fauna inventory (Biota, 2006). The field component of the survey did not identify any species of conservation significance.

Biota's reported that avian fauna within the survey area are low in comparison to that recorded by Moriarty from Wanjarri Nature Reserve, located 90 km north of the application area (Biota, 2006). However, Moriarty's records are based on many years of observation compared with 7-8 days duration of Biota's fauna survey (the report does not state how many hours was spent observing avian fauna). Therefore, whilst the avian fauna assemblage at Wanjarri is useful for comparison and risk assessment, further survey within the application area is likely produce a more extensive avian fauna list. The assessing officer does not consider further survey necessary, but suggests that Biota should consider the length of survey as a limitation when interpreting survey results.

A desktop search of available databases by Biota identified the following species as possibly occurring within the application area (Biota, 2006): Mulgara (*Dasyercus cristicauda*), Bilby, Malleefowl (*Leipoa ocellata*), Giant Desert Skink (*Egernia kintorei*), Peregrine Falcon (*Falco peregrinus*), Trapdoor Spider (*Kwonkan morairtii*), Australian Bustard (*Ardeotis australis*), Bush Stone-curlew (*Burhinus grallarius*), Striated Grasswren (*Amytornis striatus striatus*) and Long-tailed Dunnart (*Sminthopsis longicaudata*).

The Mulgara (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice 2006*) prefers habitat comprising largely immature hummock grassland (spinifex), particularly where this coincides with better watered areas such as drainage lines in sandplain or sand-dune habitat (DEC Naturebase website, 2006). The Mulgara was not trapped during the Biota survey (Biota, 2006). Habitat for this species does not occur within the application area, and the species is unlikely to occur within the area.

The Bilby (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice 2006*) was formerly known to occupy habitat ranging from *Eucalyptus* and *Acacia* woodlands in the wheatbelt of Western Australia to *Triodia* grasslands in the desert regions (DEC Naturebase website, 2006). They require sandy or loamy soil in which to burrow. Bilbies are now only found in areas where foxes do not occur or are not abundant; these include the driest and least fertile parts of their former range (DEC Naturebase website, 2006). The major habitats they now occupy within WA include mulga scrub and hummock grasslands on sandplains or along drainage or salt lake systems (DEC Naturebase website, 2006). The Bilby was not trapped during the Biota survey (Biota, 2006). Habitat for this species does not occur within the application area and there is a lack of predator control, suggesting the species is unlikely to occur within the area.

The Malleefowl (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice 2006*) is largely confined to arid and semi-arid woodland that is dominated by mallee

eucalypts on sandy soils, with less than 430 millimetres of rainfall annually (DEC Naturebase website, 2006). They may also be found in Mulga (*Acacia aneura*), and other sclerophyllous associations (DEC Naturebase website, 2006). They require sandy soils with an abundance of leaf litter for breeding. The species has been recorded at Mt Keith and nearby Wanjarri Nature Reserve but was not recorded during the Biota survey (Biota, 2006). The lack of leaf litter within the application area suggests the species is not present.

The Giant Desert Skink (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice 2006*) occurs in tussock grasslands where the soil is soft enough to dig burrows (Pearson et al, 2001). This species was not recorded by Biota during the fauna survey (Biota, 2006). Suitable habitat for this species does not occur within the application area and it is unlikely that the species occurs there.

The Biota fauna study also considered a Trapdoor spider (*Kwonkan moriartii* - DEC Priority 2) as potentially occurring within the application area (Biota, 2006). However, an assessment of the likely impact of this proposal on the conservation of this species is not possible due to a lack of information regarding this species.

The Peregrine Falcon (Schedule 4 - Fauna that is in need of special protection, *Wildlife Conservation (Specially Protected Fauna) Notice, 2006*) have a wide home range and utilise tall trees, cliffs, granite outcrops and quarries for nesting (Biota, 2006). The Peregrine Falcon was not recorded during the Biota survey (Biota, 2006). The application area would represent a small fraction of their range if present and therefore it is not likely that the proposed clearing will significantly impact on the conservation of these species. The species may utilise the tall Eucalypts at Cody's Creek for perching or nesting, however, this habitat will not be cleared for mine development.

The Australian Bustard (DEC Priority 4) prefers tussock grassland, *Triodia* hummock grassland, grassy woodland and low shrublands (Garnett et al, 2000). The species was not recorded during the Biota survey (Biota, 2006). The application area is unlikely to support populations of the Australian Bustard due to a lack of suitable habitat, and it is unlikely that the species would occur there.

The Bush Stone Curlew (DEC Priority 4) prefers sparsely grassed, lightly timbered, open forest or woodland. In southern Australia, they persist most often where there is a well-structured litter layer and fallen timber debris (Garnett et al, 2000). The Bush Stone Curlew has been recorded from the Wanjarri Nature Reserve previously but was not located during the Biota survey (Biota, 2006). Suitable habitat for this species was not recorded within the application area and it is not likely that the species occurs there, particularly given the lack of predator control.

Striated Grass-wren's (DEC Priority 4) live on sandplains dominated by mature *Triodia* hummock grassland with an overstorey of shrubs, usually mallee eucalypts, or *Acacia* (Garnett et al, 2000). The species was not recorded during the Biota survey but has been recorded from the vicinity of Mt Keith and Wanjarri Nature Reserve (Biota, 2006). Suitable habitat for the Striated Grass-wren does not occur within the application area and it is unlikely that the species occurs there.

The Long-tailed Dunnart (DEC Priority 4) occur in rocky rugged habitat from the Pilbara and upper Gascoyne region in the West (Biota, 2006). Biota provided communication from the DEC that the species has recently been recorded from plateaus near breakaways and screes and rugged boulder strewn screes in the Goldfields region. Biota consider that marginal habitat for the species occurs within the area and its presence cannot be ruled out (Biota, 2006). However, the proposed clearing is not likely to impact the conservation of the species.

The Biodiversity Coordination Section (BCS) of the Department of Environment and Conservation (DEC) considers that the surveys conducted over the area under application are adequate to enable the assessing officer to conduct the assessment against this principle (DEC, 2007).

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

Methodology Biota (2006)
DEC Naturebase website (2006)
DEC (2007)
EPA (2004a)
Garnett et al (2000)
Pearson et al (2001)
GIS database:
- Threatened Fauna - CALM 30/09/05

(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 GIS databases identified the following rare or priority flora species within a 50 km radius of the application area: *Hemigenia exilis* (P4) and *Grevillea inconspicua* (P4). There are no records of any rare or priority flora occurring within the application area (GIS Database).

Mattiske Consulting Pty Ltd (Mattiske) were commissioned by the proponent to undertake a botanical survey of the application area and surrounds. This involved a review of the conservation status of the vascular plant species of the area by reference to current literature, a site visit to collect and identify vascular plant species present in the survey area, define and map vegetation communities and provide recommendations on the local and regional significance of the vegetation communities. The on site component of the survey took place between the 19th and 22nd August 2006 (Mattiske, 2006). Whilst the survey and subsequent report are adequate to undertake assessment against this principle, the assessing officer considers that the report should include a statement of limiting factors that may influence the results of the survey.

The survey identified a total of 97 plant taxa including three alien plant species, although these species are not declared weeds under the *Agriculture and Related Resources Act, 1976* (Mattiske, 2006).

The flora survey did not identify any Declared Rare Flora or Priority Flora species (Mattiske, 2006). The survey did identify the following range extensions - *Atriplex lindleyi ssp. inflata*, *Maireana radiata*, *Acacia aneura var ?conifera*, *Acacia ?chrysellia*, *Hibiscus burtonii*, *Eremophila interstans ssp. Interstans* (Mattiske, 2006). Mattiske (2006) suggests that these recordings reflect a lack of botanical work in the region rather than being significant from a conservation perspective.

The application area is not necessary for the continued existence of a population of declared rare or priority flora.

The Biodiversity Coordination Section (BCS) of the Department of Environment and Conservation (DEC) considers that the surveys conducted over the area under application are adequate to enable the assessing officer to conduct the assessment against this principle.

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

Methodology DEC (2007)
EPA (2004b)
Mattiske (2006)
GIS Database:
- Declared Rare and Priority Flora - CALM 01/07/05

(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 (GIS Database) reveals that there are no Threatened Ecological Communities (TECs) within 50 km of the application area.

A flora survey conducted by Mattiske Consulting Pty Ltd (Mattiske) over the application area and surrounds identified twelve vegetation communities (Mattiske, 2006). None of these communities are considered to be threatened ecological communities or ecological communities at risk as identified in 'A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002' (CALM, 2002).

The Biodiversity Coordination Section (BCS) of the Department of Environment and Conservation (DEC) considers that the surveys conducted over the area under application are adequate to enable the assessing officer to conduct the assessment against this principle.

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

Methodology CALM (2002)
Mattiske (2006)
GIS Database:
- Threatened Ecological Communities - CALM 12/4/05

(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**

	Pre-European area (ha)	Current extent (ha)	Remaining %	Conservation Status	Pre-european % in IUCN Class I-IV Reserves (and current %)
IBRA Bioregion – Murchison	28,120,558*	28,120,558*	100*	Least Concern**	1.1 (1.1)*
Shire of Leonora	3,191,349***	n/a	n/a	n/a	n/a
Beard veg assoc. (Bioregion)					
18	12,403,248*	12,403,248*	100*	Vulnerable**	0.4 (0.4)*

* Shepherd et al. (2001a) updated 2005

** Department of Natural Resources and Environment (2002)

*** GIS Database

Options to select from: Bioregional Conservation Status of Ecological Vegetation Classes (Department of Natural Resources and Environment 2002)

Presumed extinct Probably no longer present in the bioregion

Endangered* <10% of pre-European extent remains

Vulnerable* 10-30% of pre-European extent exists

Depleted* >30% and up to 50% of pre-European extent exists

Least concern >50% pre-European extent exists and subject to little or no degradation over a majority of this area

* or a combination of depletion, loss of quality, current threats and rarity gives a comparable status

Explanation:

At a regional level, the Murchison IBRA Bioregion remains at approximately 100% of its pre-european vegetation extent. According to the 'Bioregional Conservation Status of Ecological Vegetation Classes' (Department of Natural Resources and Environment, 2002), this value gives the region a Conservation Status of 'Least Concern'.

The proposed clearing area falls within the Shire of Leonora. There is no information as to the current extent of vegetation within the Shire. However, the Shire of Leonora falls entirely within the Murchison IBRA Bioregion and it is reasonable to conclude that the Shire remains at approximately 100% of its pre-european vegetation extent. According to the 'Bioregional Conservation Status of Ecological Vegetation Classes' (Department of Natural Resources and Environment, 2002) this value would give the Shire a Conservation Status of 'Least Concern'.

Within the Murchison IBRA Bioregion, Beard vegetation association 18, located within the application area remains at approximately 100% of its pre-european vegetation extent. According to the 'Bioregional Conservation Status of Ecological Vegetation Classes' (Department of Natural Resources and Environment, 2002), these values give the vegetation types a Conservation Status of 'Least Concern'. Whilst there is little of the vegetation within the Murchison IBRA Bioregion in conservation estate, given that the vegetation association remains uncleared, it is not considered that plant communities within the Murchison Bioregion are under threat.

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

Methodology Department of Natural Resources and Environment (2002)
 Shepherd et al (2001) updated 2005
 GIS Database:
 - Local Government Authorities - DLI

(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 may be at variance to this Principle**

According to available databases a minor - non-perennial drainage line occurs in the eastern part of the application area (GIS Database). This drainage line is Cody's Creek.

During a site visit, the assessing officer observed Cody's Creek and determined that whilst the creekline is dry for most of the year, pools of water remain within the creekline for some time following significant rainfall events. It supports large *Eucalyptus camaldulensis* that could be considered significant habitat on a local scale. The creek would also support several frog species. Cody's Creek has a catchment area of approximately 230 sq. km, with a stream length of 28.9 km (URS, 2006). As such it acts to capture sheet flow from heavy rainfall events, discharging water to Lake Raeside, 50 km south. It is not dependent on groundwater for flows.

Sir Samuel Mines have advised (URS, 2006) that mine pit, waste rock dumps, TSF and other infrastructure will be situated within the application area such that disturbance to Cody's Creek is avoided. Water gained from mine de-watering efforts surplus to site requirements is intended to be discharged into a drainage line to the west of the application area. The amount of water to be discharged per day is approximately 1500 cubic metres, which is equivalent to about half an olympic swimming pool. The water to be discharged is considered fresh at 1000 Total Dissolved Solids (TDS). Sir Samuel will establish monitoring points within the drainage line to gauge the effects of the discharge program. An assessment of the impact of this de-watering program is captured under the Mining Proposal, which must be approved by DoIR prior to the commencement of the project. Given the relative low levels of water to be discharged and the high evaporation rates encountered in this area, the discharge of water into the drainage line is not likely to cause flooding.

The haul road from the mine site to Weebo - Windarra Road, will require crossings at several ephemeral drainage lines. No significant culverts or crossing structures are required (URS, 2000). Approximately 0.6 hectares of vegetation type A1 is expected to be cleared to create these crossings. A1 is not a vegetation type that is riparian in nature.

Based on the above, the proposed clearing may be at variance to this Principle as there will be clearing of vegetation within ephemeral drainage lines. However, the amount to be cleared is insignificant compared with the total amount of this vegetation type.

Methodology URS (2006)
GIS databases:
- Hydrography, Linear - DOE 1/2/04

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

Comments Proposal may be at variance to this Principle

The application area has been surveyed by the Department of Agriculture and Food (Pringle et al 1994) and is composed of the following land systems (GIS Database):

- Monk
- Windarra
- Wilson
- Gransal
- Desdemona
- Duketon

The Monk land system is described as hardpan plains with occasional sandy banks, supporting mulga shrublands and wanderie grasses (Pringle et al, 1994). Drainage tracts land units within the system are mildly susceptible to water erosion (Pringle et al, 1994). Alteration of natural flow regimes may lead to water starvation of vegetation down gradient (Pringle et al, 1994).

The Windarra land system is described as stony plains with quartz mantles supporting Acacia - Eremophila shrublands (Pringle et al, 1994). Hardpan plains and drainage floors are mildly susceptible to erosion if stony mantles are removed (Pringle et al, 1994).

The Wilson land system is described as large creeks with extensive tributary fans supporting mulga and halophytic shrublands (Pringle et al, 2004). This land system is highly susceptible to soil erosion if cleared and disturbed (Pringle et al, 1994). It is noted by the assessing officer that Sir Samuel intend to avoid clearing major creeks such as Cody's Creek.

The Gransal land system is described as stony plains and low rises on granite, supporting mainly halophytic shrublands (Pringle et al, 1994). Saline stony plain land units are susceptible to soil erosion if vegetation cover is removed (Pringle et al, 1994).

The Desdemona land system is described as extensive plains with deep sandy or loamy soils supporting mulga shrublands and wanderie grasslands (Pringle et al, 1994). This land system is not susceptible to soil erosion due to the plains receiving very dispersed or no run-on, lack of slope, dense vegetation and diffuse flow (Pringle et al, 1994).

The Duketon Land System is described as stony wash plains with mulga shrublands and wanderie banks

(Pringle et al, 1994). This land system is generally not susceptible to soil erosion (Pringle et al, 1994). However, where natural hydrological characteristics are altered, water starvation may result (Pringle et al, 1994). The application area only covers a very minor portion of this land system and it is not anticipated that any clearing will take place within this land system.

Therefore, land degradation in the form of soil erosion may result where areas of stony mantle are removed or soil is disturbed. Care will need to be taken to divert run-off from these areas if they remain open. Alteration to sheet flow may cause water starvation down gradient in some areas.

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

Methodology Pringle et al (1994)
GIS Database:
- Rangeland Land System Mapping - DA

(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

According to available databases, the nearest conservation reserve to the application area is Wanjarri Nature Reserve, located approximately 90 km north (GIS Database). At this distance, there is little likelihood that the proposed clearing will impact the conservation values of Wanjarri Nature Reserve.

The Biodiversity Coordination Section (BCS) of the Department of Environment and Conservation (DEC) considers that the surveys conducted over the area under application are adequate to enable the assessing officer to conduct the assessment against this principle (DEC, 2007).

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

Methodology DEC (2007)
GIS database:
- CALM Managed Lands and Waters - CALM

(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 is not in a Public Drinking Water Source Area (GIS database).

The application area occurs in a semi arid region and experiences rainfall of approximately 233 mm/year (Leonora - BOM, 2007). Most rain falls in summer, autumn and early winter. Rainfall during this time is mostly due to cyclonic or tropical depression events and can be brief but heavy. For instance the highest recorded daily rainfall for Leonora is 105.9 mm in February (BOM, 2007). This suggests that most surface flows occur as sheet flows that collect in drainage lines and flow towards salt lakes.

Surface water is therefore confined to rainfall events, but likely to contain sediments. Flows occurring in drainage lines are likely to be fast and turbid, with high levels of sediments. Natural erosion is likely to occur.

It is considered that the clearing of up to 200 hectares of vegetation will not significantly increase the amounts of sedimentation entering watercourses. Sir Samuel Mines have committed to constructing a flood protection berm around the eastern side of the mine to prevent sediment laden run-off from leaving the project area. Sheet flow will be diverted to basins to allow sediments to settle before discharge to drainage lines (URS, 2006).

Ground water in the applied to clear is fresh, with a salinity of approximately 1000 mg/L TDS or less and occurs approximately 13-14 metres below surface (URS, 2006). Vegetation is unlikely to be dependent on groundwater at this depth. The clearing of vegetation is not likely to increase the height of the water table, or alter its salinity. Sir Samuel Mines intend to de-water the mine (URS, 2006) which will cause a drop in ground water levels for the life of the mine.

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

Methodology BOM (2007)
URS (2006)
GIS Database:
- Public Drinking Water Source Areas (PDWSA's)- DoW

(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

In supporting documentation for the clearing permit application, URS provided information regarding predicted surface water flows following construction of the mine site.

Pre-construction, the average annual run-off for the catchment areas in which the application area is situated is 2410 mm/year. Post-construction, the average annual run off is expected to be 2578 mm/year. This is an increase of 7% per year. The largest catchment within the area is that of Cody's Creek, which will experience a 1% increase in run-off (URS, 2006).

Given the low amount of rainfall experienced by the application area of approximately 233 mm/year (BOM, 2007), these increases are not likely to lead to an increase in flood height or duration.

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

Methodology BOM (2007)
URS (2006)

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

Comments

The Federal court dismissed Native Title Claims by the Wongatha people and portions of the Koara, Wutha and Ngalia Kutjungkatja native title claims where they overlapped the Wongatha claim. Therefore there is no native title over the area subject to this application. The mining tenements have now been granted and the clearing is for a purpose consistent with the tenement type, therefore the granting of a clearing permit is not a future act under the *Native Title Act, 1993*.

An Aboriginal site of Significance occurs within M37/1275, (site no. 1052) (Cody's Creek - GIS Database). Sir Samuel Mines are aware of the site and have positioned mine infrastructure to avoid disturbance to the site. Aboriginal Sites of Significance can be a trigger for referral to the EPA under an MOU between DoIR and EPA. DIA have advised that the site 'Cody's Creek' does not meet the terms of Section 5 of the *Aboriginal Heritage Act, 1972* and is maintained on the Register as a Stored Data site only. The assessing officer considers that it is not necessary to refer the application to EPA. 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.

Advice has been received from the Department of Environment and Conservation's - Industry Regulation Section that the Sinclair Nickel project is currently subject to Groundwater License CAW161819. This allows the proponent to drill exploratory wells and test pump those wells to determine dewatering requirements for the project. The discharge of mine dewatering would be subject to a license issued under the *Environmental Protection Act, 1986* (DEC, 2007). 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.

A public submission was received during the public comments period. The submission raised two separate issues:

- That the flora survey was carried out during a dry year and that a number of species would have been difficult to identify due to a likely lack of flowers and seeds;
- That riparian vegetation should be protected.

The assessing officer does not consider it necessary for the proponent to undertake a further survey in Spring 2007. However, the consultant engaged by Sir Samuel (Mattiske) may wish to include the lack of rainfall as a limitation within it's survey report. The assessing officer is satisfied that riparian vegetation within Cody's Creek will not be cleared. Sir Samuel have committed to protecting the creek and have sited all clearing for mine development to the west of the creek.

Methodology DEC (2007)
DIA (2007)
GIS Database:
- Aboriginal Sites of Significance - DIA

4. Assessor's recommendations

Purpose	Method	Applied area (ha)/ trees	Comment / recommendation
Mineral Production	Mechanical Removal	200	The proposal has been assessed against the clearing principles and the proposal has been found to be not at variance to principle h, not likely to be at variance to principles a, b, c, d, e, , i and j, and may be at variance to principles f and g.

The assessing officer concludes that potential impacts to the environment can be mitigated by conditions imposed on the permit. Therefore, the assessing officer recommends that the permit be granted subject to the following conditions:

1. The Permit Holder shall record the following for each instance of clearing:
 - (a) the location where the clearing occurred, expressed as grid coordinates using the Geocentric Datum of Australia 1994 coordinate system;
 - (b) the size of the area cleared in hectares;
 - (c) the method of clearing; and
 - (d) the purpose of clearing;
2. The Permit Holder shall provide a report to the Director, Environment, Department of Industry and Resources by 31 August each year for the life of the permit, setting out the records required under condition 1 of this permit in relation to clearing carried out between 1 July and 30 June the previous year. This report can be included as an addendum to the Annual Environmental Report. The report must also provide detail as to how the Permit Holder has complied with all other conditions.
3. When undertaking any clearing, revegetation and rehabilitation, or other activity pursuant to this Permit the Permit Holder must take the following steps to minimise the risk of the introduction and spread of weeds:
 - (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
 - (b) ensure that no weed-affected road building materials, mulch, fill or other material is brought into the area to be cleared; and
 - (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.
4. The Permit holder shall stockpile topsoil and vegetation to be used in rehabilitation.

5. References

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- URS (2006). Final Report. Supporting Documentation for the Clearing Permit Application Sinclair Nickel Project. Prepared for Sir Samuel Mines NL.

6. Glossary

Acronyms:

BCS	Biodiversity Coordination Section
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.
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.