



1. Application details

1.1. Permit application details

Permit application No.: 1767/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Straits (Whim Creek) Pty Ltd

1.3. Property details

Property: M47/238
Local Government Area: Shire Of Roebourne
Colloquial name: Mining Lease 47/238 - Whim Creek Copper Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
30		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	Clearing Description	Vegetation Condition	Comment
<p>Beard vegetation associations have been mapped at a 1:250 000 scale for the whole of Western Australia, and are a useful tool to examine the vegetation extent in a regional context. One Beard vegetation association is located within the area proposed to be cleared. This is:</p> <p>649: Sedgeland; Various sedges with very sparse snakewood (GIS Database).</p> <p>Vegetation of the area is closely related to the geomorphology, habitat, climate and disturbance impact. Four broad geomorphic habitats were identified by Astron Environmental Services (2006). These were:</p> <p>Drainage Lines and Zones: This includes broad shallow drainage lines with alluvial silts and small stones, narrow incised drainage lines with pebbles and stones and very broad drainage zones with alluvial silts. Drainage lines are varied and are numerous on the site;</p> <p>Hill Slopes: Includes both lower and upper slopes with skeletal silts, rocks and some outcropping rock;</p> <p>Hill Crests: Include shale and rock outcrop on the crest and ridges of hills; and</p> <p>Flat Stony Plains: Includes very gently undulating as well as flat plains which vary in substrate, silt depth and stony</p>	<p>Straits Whim Creek Copper Pty Ltd (from this point on referred to as Straits) is seeking permission to clear up to 30 hectares of native vegetation, within approximately 980 hectares of the M47/238 lease. The purpose of the clearing is to maintain effective operational development, and may include clearing for mine infrastructure and services. It is anticipated that the majority of the clearing will occur within reasonable proximity to current operational areas (Straits, 2007).</p> <p>To minimise the impacts associated with clearing of vegetation and loss of fauna habitat, a number of strategies will be implemented. These Flora and Fauna Impact Management Strategies are outlined in the Environmental Management Plan (EMP) and include:</p> <p>SITE PREPARATION:</p> <ul style="list-style-type: none"> - Prior to clearing, an internal Environmental Clearance Form will be completed and approved by the Environmental Coordinator and Resident Manager; - Areas to be cleared will be adequately flagged to ensure only required clearing is undertaken; - Prior to clearing, the proposed area will be inspected to verify that no active Pebble-Mound Mouse mounds or Pilbara Olive Pythons exist in the area. If identified, clearing will be delayed until advice has been received from Department of Environment and Conservation (DEC); - To avoid weed problems, machinery 	<p>Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994)</p> <p>To</p> <p>Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery, 1994)</p>	<p>The vegetation condition is based on the information provided by Straits (2007).</p> <p>The composition of native flora is for most part excellent, however, some of the vegetation structure has been obviously altered by continual fire history and both previous and current mining practices (Astron Environmental Services, 2006).</p> <p>A number of vegetation surveys in the vicinity of the proposed clearing area have been conducted, dating back as far as 1991 (Straits, 2007). The most recent flora surveys were conducted by Astron Environmental Services (September 2006), and Onshore Environmental Consultants (October 2006) (Straits, 2007).</p> <p>Mining Lease M47/238 is located within the Sherlock Pastoral Lease. Historically, vegetation has been disturbed by pastoral activities and mining dating back to the late 1880's (Straits, 2007). Disturbances include mine adits and workings, hill side tunnels, access and pastoral tracks, an old airstrip, mining camp and coring facilities (Straits, 2007). The entire tenement, with the exception of small random pockets of vegetation, has been burnt in the past, with some areas burnt more recently than others (Astron Environmental Services, 2006).</p>

mantle (Astron Environmental Services, 2006).

A total of 15 broad vegetation types and 40 associations were identified during the September 2006 survey (Astron Environmental Services, 2006), which closely relate to the geomorphic units. These are:

DRAINAGE LINES AND ZONES:

Acacia tumida shrubland/heath drainage lines;

Acacia acradenia shrubland/heath drainage lines;

Acacia orthocarpa shrubland/heath drainage lines;

Mixed shrubland/heath drainage lines; and

Herbland drainage lines.

HILL SLOPES:

Acacia bivenosa shrubland on hill slopes;

Acacia pyriformis shrubland on hill slopes;

Triodia epactia hummock grassland on hill slopes (and plains);

Mixed shrubland on hill slopes; and

Acacia acradenia shrubland on hill slopes.

HILL RIDGES AND CRESTS:

Open shrub and herbland on hill ridge and crest; and

Hummock grassland and herbs on hill crest.

FLAT STONY PLAINS:

Hummock grassland and herbs on hill crest; and

Acacia shrubland on plains.

and vehicles used for construction and during operation will be inspected for weeds prior to site entry;

- Clearing will occur in a manner that facilitates the re-use of topsoil, subsoil, vegetation and seeds for revegetation. Seed collection will occur where practical to capitalise on projected high seed loads from favourable seasonal rainfall;

- To facilitate rehabilitation, valuable components of the topsoil will be conserved, including seeds, organic matter, nutrients, micro flora and fauna. Where possible, 10 centimetres of topsoil will be stripped, followed by 20 centimetres of subsoil. Vegetation, topsoil and subsoil will be stored separately in stockpiles no higher than 1.8 metres at predetermined locations; and

- Stockpiles will be located as not to impede surface drainage and to have minimal visual impact, as specified in the EMP. The stockpiles will be signposted and stockpile volumes documented.

POST-CLEARING:

- Following disturbance, cleared areas and stockpiles will be documented on the Site Plan and reported in the Annual Environmental Report to DoIR and DEC.

REHABILITATION:

- Native seed stock will be utilised to revegetate cleared areas as supplement to natural regeneration; and

- Weed control programs will be implemented, if necessary, to control noxious weeds within the rehabilitation area.

3. Assessment of application against clearing principles

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

Comments

Proposal is not likely to be at variance to this Principle

The clearing permit area is located within the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion, and the Chichester IBRA subregion (GIS Database). The Chichester subregion (PIL 1) comprises the northern section of the Pilbara craton. Plains support hummock grasslands. The climate is Semi-desert-tropical and receives 300 mm of rainfall annually. The dominant land use is grazing, Aboriginal Lands, Reserves and Mining leases. Areas of high species and ecosystem diversity include the hummock grassland reptile and small mammal communities; and the cracking clay communities of the Chichester Range and Mungaroona Range (Kendrick and McKenzie, 2001).

The Beard vegetation association 649, associated with this clearing permit application area, is localised around the clearing area, however it is quite extensive (approximately 40,000 hectares within the state) (GIS

Database). It is unlikely that the biodiversity of the proposed clearing area will differ greatly from the surrounding less disturbed areas.

Surveys conducted throughout the entire Whim Creek Copper Mine (WCCM) area (which encompasses the M47/238 lease), have identified 162 plant taxa, representing 86 genera and 38 families (Straits, 2007), which does not represent high speciation.

Astron Environmental Services (2006) have stated that as a result of a targeted flora survey conducted in September 2006, no Declared Rare or Priority flora were located within the survey area.

Given the previous disturbances which have occurred in the area, it is unlikely that the native vegetation within the clearing permit area will have a higher level of biological diversity than surrounding less disturbed areas.

Two birds of conservation significance, The Bush Stone-Curlew and Rainbow Bee-Eater, were recorded on site in a recent ENV Australia survey, however, they are not expected to rely solely on the M47/238 lease for habitat or foraging (ENV Australia, 2006).

The majority of the vegetation types and potential fauna habitats are represented elsewhere within, and external to the proposed clearing area.

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

Methodology Astron Environmental Services (2006).
ENV Australia (2006).
Kendrick and McKenzie (2001).
Straits (2007).
GIS Database:
- Interim Biogeographic Regionalisation of Australia (subregions) - EA 18/10/00.
- Interim Biogeographic Regionalisation of Australia - EA 18/10/00.
- Pre-European Vegetation - DA 01/01.

(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 likely to be at variance to this Principle

A number of fauna surveys have been conducted in the general WCCM area (Straits, 2007). These are:

- Mons Cupri Copper Mine Project Notice of Intent Biological Assessment Survey (Ecologia) (Report for Dominion Mining Limited), February 1991;
- Whim Creek Copper Project Biological Assessment Survey (Ecologia), June 2004;
- Mons Cupri Haul Road Realignment Fauna Habitat Survey (ENV Australia), November 2005;
- Mon Cupri Western Pebble-Mound Mouse Survey (ENV Australia), August 2006; and
- Whim Creek Fauna Assessment Phase II (ENV Australia), October 2006 (Straits, 2007).

The ENV Australia (2006) Whim Creek Fauna Assessment Phase II survey concluded that faunal habitats are closely aligned with landform and vegetation associations in the Whim Creek area. A total of 113 species were identified in the ENV Australia (2006) survey, including 13 mammal species, 43 reptile species, 56 bird species and 1 amphibian species.

Two species of conservation significance were recorded during the ENV Australia (2006) survey. These are the Bush Stone-Curlew (*Burhinus grallarius*) (Priority 4 DEC) and the Rainbow Bee-Eater (*Merops ornatus*) (Migratory, *Environmental Protection and Biodiversity Conservation Act* (EPBC Act) 1999).

Indirect evidence of the Bush Stone-Curlew was found in the form of faint tracks near the Hotel Bore, and a call typical of this species was heard south of Mons Cupri (ENV Australia, 2006). This species is a well camouflaged, ground nesting bird which prefers to 'freeze' rather than fly when disturbed. It inhabits lightly timbered open woodlands (Pizzey and Knight, 1997).

The Rainbow Bee-Eater was sighted at the Balla Balla River during the survey. The Rainbow Bee-Eater is an opportunistic species known to inhabit open woodlands with sandy, loamy soil, sandridges, sandpits, riverbanks, road-cuttings, beaches, dunes, cliffs, mangroves, rainforest, woodlands and golf courses, where it prefers to nest in sandy ground, banks and cuttings (Pizzey and Knight, 1997).

It is unlikely that either of the two species are entirely dependant on habitats found within the M47/238 area (ENV Australia, 2006).

A number of fauna of conservation significance previously recorded within the project area were not detected during the ENV Australia (2006) survey. These included the Olive Python (*Liasis olivaceus barroni*), Ghost Bat (*Macroderma gigas*) and Western Pebble-Mound Mouse (*Pseudomys chapmani*). It should be emphasized that habitat requirements of these species are well represented elsewhere and are not unique to the M47/238

tenement area.

Although the Pilbara Olive Python was not recorded in the Phase II survey of Whim Creek, it was recorded in the Phase I survey in the Mons Cupri area (ENV Australia, 2006). Disturbance to riverine areas containing rock pools or creeks within the project area should be minimised would avoid negatively impacting this species if it was still present (ENV Australia, 2006).

For caves and adits that may serve as potential roosting sites to the Ghost Bat, it is recommended that re-entry of bats be prevented by sealing of the entry points after sunset. This would apply particularly to those caves and adits in the Whim Creek and Mons Cupri regions (ENV Australia, 2006).

Clearing of scree slopes suitable for construction of pebble-mounds should be minimised to avoid negative impacts on the Western Pebble-Mound mouse, evidence of which has been reported on a number of occasions within the mining tenement (ENV Australia, 2006).

The species *Corymbia hamersleyana* is associated with the vegetation community P6, as identified by Astron Environmental Services (2006). This species may contain significant fauna habitat in the landscape. Straits have committed to minimising the impact to this species, and avoiding clearing where possible (Straits, 2007). Straits have also committed to collect seeds to be used in rehabilitation if *Corumbia hamersleyana* is to be cleared.

To minimise the impacts associated with the clearing of vegetation on significant faunal habitat, Straits have implemented a number of strategies, outlined in the Environmental Management Plan (EMP) (Straits, 2007). These include:

- Areas to be cleared will be adequately flagged to ensure only required clearing is undertaken; and
- Prior to clearing, the proposed area will be inspected to verify that no active Pebble-Mound Mouse mounds or Pilbara Olive Pythons exist in the area. If identified, clearing will be delayed until advice has been received from DEC.

Habitats within the WCCM have been well surveyed and are generally well represented within the Pilbara region. Furthermore, none of the habitats surveyed during the Astron Environmental Services (2006) survey appeared to be of specific importance. The area has been extensively surveyed and few species of conservation significance have been recorded.

Fauna habitats within the proposed areas to be cleared are closely linked to vegetation associations and landforms. Therefore the habitats are well represented elsewhere within the tenement boundaries and its surrounds, and no significant loss of habitat for fauna indigenous to WA is expected (Straits, 2007).

Based on the above, the proposal is likely be at variance to this Principle.

Methodology Astron Environmental Services (2006).
ENV Australia (2006).
Pizzey and Knight (1997).
Straits (2007).

(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 database reveals no threatened flora species within a 50 kilometre radius of the application area (GIS Database). The nearest recorded Declared Rare Flora (DRF) is *Terminalia supranitifolia*, located approximately 106 kilometres west of the proposed clearing area (GIS Database).

Despite a thorough search of 147 hectares of the proposed clearing area, no DRF were found (Astron Environmental Services, 2006; Onshore Environmental Consultants, 2006). No Protected Plant Taxa as listed under Section 179 of the Environmental Protection and Biodiversity Conservation Act 1999 were found (Astron Environmental Services, 2006).

Habitat reviews by Astron Environmental Services (2006) indicate that declared rare flora species are unlikely to occur within the proposed clearing area.

Previous survey records for the M47/238 tenement and surrounding areas indicate that two priority species of flora have may be present in the proposed clearing area (Astron Environmental Services, 2006; Onshore Environmental Consultants, 2006). These are:

- *Gomphrena culculata* (P2); and
- *Acacia glaucocoesia* (P3) (Astron Environmental Services, 2006).

However, no Priority flora species as listed on the DEC's own priority list were located during the Astron Environmental Services (2006) survey.

Another species, *Abuttrion trudgenii* ms (P3) was identified during the Onshore Environmental Consultants (2006) survey as occurring near the M47/238 lease. However, as this species occurs outside the mining lease, it is not expected to be impacted by the proposed clearing.

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

Methodology Astron Environmental Services (2006).
Onshore Environmental Consultants (2006).
GIS Database:
- Declared Rare and Priority Flora List - 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

There are no known Threatened Ecological Communities (TECs) in the vicinity of the proposed clearing area (GIS Database). No TECs have been identified at the site during the numerous vegetation surveys (Astron Environmental Services, 2006; Onshore Environmental Consultants, 2006; Straits, 2007). No ecosystems considered to be at risk (vulnerable) were identified during the Astron Environmental Services (2006) survey.

The nearest endorsed TECs are the Themeda Grassland Communities, located approximately 155 kilometres south from the clearing permit application area (GIS Database). The clearing will not impact this community.

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

Methodology Astron Environmental Services (2006).
Onshore Environmental Consultants (2006).
Straits (2007).
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

Approximately 100% of the Pre-European vegetation remains in the IBRA Pilbara Bioregion and Chichester Subregion, within which this proposal is located (see table below) (GIS Database, Shepherd *et al.*, 2001). Available aerial photography (GIS Database) and information from various biological surveys conducted within the local area (Astron Environmental Services, 2006; ENV Australia, 2006; Onshore Environmental Consultants, 2006) indicate that the areas surrounding this clearing permit application have not been cleared extensively.

	Pre-European area (ha) *	Current extent (ha)*	Remaining % *	Conservation status	% in reserves/ CALM managed lands *
IBRA Bioregion					
- Pilbara	17, 804, 164	17, 794, 651	99.9%	Least concern	6.3%
IBRA Subregion					
- Chichester	8,373,870	8,373,617	100%	Least concern	6.5%
Beard vegetation Association					
- 649	40, 365	40, 365	100%	Least concern	0.0%

* Shepherd *et al.* (2001)

** Department of Natural Resources and Environment (2002)

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	

Therefore, the proposed clearing area cannot be considered a remnant of native vegetation within an extensively cleared area.

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

Methodology Astron Environmental Services (2006).
ENV Australia (2006).

Onshore Environmental Consultants (2006).
Shepherd *et al.* (2001)
GIS Database:
- Interim Biogeographic Regionalisation of Australia (subregions) - EA 18/10/00.
- Interim Biogeographic Regionalisation of Australia - EA 18/10/00.
- Roebourne 1.4m Othomosaic - DOLA 00.

(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 likely to be at variance to this Principle

There are no bodies of standing surface water or wetlands within the proposed clearing application area. However, the landscape is scattered with minor ephemeral drainage lines that are in upper reaches of the Balla Balla River and Salt Creek catchments (GIS Database). As the vegetation of the area is closely related to the geomorphology, it is anticipated that some clearing of vegetation associated with the ephemeral drainage lines may occur. Straits have committed to obtaining a Section 17 Permit to Obstruct or Interfere with Bed and Banks from the Department of Water (DoW) prior to clearing of any riparian vegetation along these drainage lines. Straits have also committed to avoid clearing of intermediate sized tributaries wherever practicable (Straits, 2007).

It is not anticipated that clearing within minor drainage lines will have a significant impact on the regional hydrology of the area, as flows are dependant on high intensity rainfall events where there is a tendency for the system to become supersaturated (Straits, 2007). There is also some indication that the majority of the riparian vegetation within these systems is groundwater rather than surface water dependant (Onshore Environmental Consultants, pers.comm. as cited in Straits, 2007).

The only significant watercourse associated with the M47/238 mining tenement is the Balla Balla River, which is an ephemeral river four kilometres east of M47/238 lease, and will not be impacted by the proposed clearing.

In regards to the ephemeral drainage lines in the area, Straits (2007) have committed to:

- Obtaining a Section 17 Permit to Obstruct or Interfere with Bed and Banks from DoW prior to any clearing being undertaken;
- Clearing of drainage lines will involve the area being adequately flagged and the clearing supervised;
- Where permanent tracks are to be established over drainage channels, culverts will be installed and silt/sediment traps constructed to prevent sediment from entering drainage channels; and
- Prior to any clearing of drainage lines for tracks, the crossing point will be reviewed, and if necessary relocated, to ensure that the least possible impact occurs.

Based on the above, the proposal is likely to be at variance to this Principle.

Methodology Straits (2007).
GIS Database:
- ANCA, Wetlands - CALM 08/01.
- Geodata, Lakes - GA 28/06/02.
- Hydrography, linear - DOE 1/2/04.
- Hydrography, linear (hierarchy) - DOW.
- Rivers 250K - GA.

(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 proposed clearing area has been identified as belonging within the Ruth Land System (Astron Environmental Services, 2006). The Ruth Land System is defined as hills and ridges of volcanic and other rocks supporting hard spinifex (occasionally soft spinifex) grassland (Van Vreeswyk *et al.*, 2004). The geomorphology of the area includes rounded hills and ridges, with restricted lower slopes and stony interfluves, and moderately to widely spaced drainage patterns (Van Vreeswyk *et al.*, 2004). The system is also prone to fairly regular burning, however, it is not susceptible to erosion (Van Vreeswyk *et al.*, 2004).

The soils are skeletal sandy loams, and shallow sandy earthy loams on hills and ridges. The soils encountered in the WCCM area are mainly colluvial soils, comprising mixtures of sandy clayey gravels, and gravely clayey sands, with depths ranging from 0.2 metres to 0.9 metres to rock (Astron Environmental Services, 2006).

Straits (2007) states that the soils in the area are free from limiting factors.

Although six Declared Noxious Weeds (DNWs) are known to occur in similar habitats between Karratha and Port Headland, no DNWs were identified around the Mons Cupri area (Astron Environmental Services, 2006).

Several nuisance weed species have the potential to occur within the lease boundaries of the WCCM,

especially due to the history of pastoral and mining activity. During the survey of the Mons Cupri area, it was determined that the occurrence and cover of weed species is remarkably low (<5%), and only two occurrences of environmental weeds were found within the 147 ha study area (Astron Environmental Services, 2006). These were a small population (<10 plants) of *Cenchrus ciliaris* (Buffel Grass) found near the old airstrip and one *Aerva javanica* (Kapok) plant found at the pit access track, which was subsequently removed (Straits, 2007). As the Buffel Grass occurs on a pastoral lease, it is not considered a weed, but rather a fodder grass (Straits, 2007).

Prior to any vegetation clearing at the Whim Creek Copper Mine, machinery and vehicles are inspected for weeds prior to site entry (Straits, 2007).

Straits has an Environmental Management Plan in place, which outlines the implementation of weed control.

The implementation activities include:

- A weed inventory compiled which includes weed species and appropriate control procedures;
- Assessment will be made of existing or potential weed infestations in the area of the mine as an indication of background levels already in existence. Assessment will be made of areas to be stripped of topsoil for subsequent mining;
- Should weed problems become excessive in disturbed areas, chemical control will be necessary (i.e. in rehab areas and topsoil stockpiles). A variety of chemicals are available to control broad leaf or grass weeds;
- Prevent disturbance of natural bush areas by:
 - Restricting site access to authorised personnel only; and
 - Restricting access of site personnel to clearly defined roads and tracks;
- Vehicles/machinery entering the site for the first time or from other operations (both pastoral and mining) or have been operating off road in weed infested areas will be cleaned down in designated cleaning areas on entering site, preferably on a hardstand;
- Materials from the clean down area will be treated with herbicide to prevent the escape of weeds (i.e. seed, vegetative material);
- Contractors coming onto site are aware of weed hygiene requirements and have cleaned down vehicles and equipment prior to arriving on site;
- Ensuring that all imported construction material etc. is free of weeds; and
- Progressive rehabilitation of cleared areas shall be undertaken to assist in reducing the spread of weeds (Straits, 2007).

The proponent has

The WCCM was constructed in 2004, and has been operational since 2005, with approximately 145 hectares of vegetation cleared to date (Straits, 2007). Regular inspections of cleared areas have indicated no evidence of erosion (Straits, 2007). This is supported by a recent soil survey that stated the soils at the WCCM have limited erosion potential (Straits, 2007). As a result it is anticipated that further clearing conducted as part of this Purpose Permit will have a low erosion risk (Straits, 2007).

Due to the dry, arid climatic environment associated with the Pilbara area, dust generation has the potential to impact on surrounding vegetation. As such, management measures will be implemented to suppress dust generation in all stages of development and operation, significantly reducing potential impacts to the native vegetation (Straits, 2007).

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

Methodology Astron Environmental Services (2006).
Straits (2007).
Van Vreeswyk *et al.* (2004).

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

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

The nearest DEC management areas are the Class 'A' Mungaroon Range Nature Reserve and the Class 'A' Millstream - Chichester National Park, located approximately 50 kilometres south of the proposed clearing area (GIS Database). Based on the distance between the proposed clearing area and the conservation areas, adverse impacts on the environmental values of the reserves are unlikely.

The Red Book Area System 8.7 - Coastal Region - Mary Anne Islands to Cape Keraudren is located approximately 16 kilometres north of the proposed area (GIS Database). Based on the distance between the proposed clearing permit area and the Mary Anne Islands to Cape Keraudren, any adverse impacts on the environmental values of that area are unlikely.

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

Methodology GIS Database:
- CALM Managed Lands and Waters - CALM 1/07/05.

- CALM proposed 2015 pastoral lease exclusions.
- CALM Regional Parks - CALM 12/04/02.
- Register of National Estate - EA 28/01/03.
- System 1 to 5 and 7 to 12 Areas - DEP 06/95.

(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 proposed clearing is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database).

Groundwater within the area under application is fresh to brackish, at between 1,000 - 3,000 milligrams per litre of Total Dissolved Solids (TDS) (GIS Database). Given the small size of the proposed clearing, the quality of the groundwater is unlikely to be impacted by the proposed clearing activity.

The proposed area is hilly, and is not associated with any permanent watercourse or waterbody (GIS Database). There are, however, numerous watercourses within the proposed clearing area. All of these are minor, non-perennial creeklines and drainage lines (GIS Database).

Surface water drains to the Balla Balla River in the east and Salt Creek to the west (Straits, 2007). There are numerous ephemeral drainage lines throughout the Whim Creek landscape, with the larger tributaries of the Balla Balla River being Loudon Creek, Caporn Creek and Whim Creek (Straits, 2007).

There are no stream flow data for any of the rivers or creeks in the Whim Creek area (Straits, 2007). The nearest gauging station is on the Sherlock river, approximately 20km west of Whim Creek (Straits, 2007). Records indicate that there is no flow for an average of 300 days each year, and very high flows for short periods in some years (Straits, 2007). The records also show that there was one year with no flow in the Sherlock River out of the 15 years of recording (Straits, 2007).

The Balla Balla River has a catchment area above the Whim Creek mine site estimated to be approximately 200km² (Straits, 2007). Through comparison with Sherlock River data, the average flow in the Balla Balla River is estimated to be at least 107kL/yr (Straits, 2007). The majority of flow occurs in short periods of flooding and there is no flow for most of the year (Straits, 2007). Based on the above, it is unlikely that clearing of vegetation would increase the sedimentation load on the creeks.

Groundwater in this area is controlled by rock jointing, shearing, quartz veining and volcanic layering (Straits, 2007). There is generally a continuous body of groundwater in the area that has been tested in several hydrological studies. Some poorly jointed rock has both low porosity and permeability. Consequently, the potential groundwater yield from some localities is negligible (Straits, 2007).

The groundwater is recharged directly from rainfall on rock and overburden, and by infiltration beneath gullies and creeks when there is stream flow. In most places, the groundwater is under pressure, with water in bore holes rising to an elevation a few meters above that at which it was intersected (Straits, 2007). Static water levels range from 3 - 15 meters below ground level, being generally shallower beneath the major drainages and other low ground (Straits, 2007).

The hydraulic surface slopes downwards from Mons Cupri towards the Balla Balla River, and continues to decline downstream. There is also a hydraulic gradient towards Salt Creek in the west (Straits, 2007).

The major drainage of Balla Balla River and Salt Creek are underlain by brackish groundwater (1800 and 3300 mg/L respectively). In general, groundwater at Mons Cupri and in the smaller drainage lines has lower salinity beneath elevated ground.

The clearing anticipated as part of this Purpose Permit is not expected to have a detrimental impact on surface or groundwater quality. Management measures will be implemented to reduce sediment impacts, where required (Straits, 2007). A quarterly groundwater monitoring program is currently undertaken across the site, which has indicated little impacts associated with past clearing activities. In addition, a review of the aquifer is conducted by external hydrogeologists on an annual basis, with this report submitted to the Department of Water for assessment (Straits, 2007).

The limited amount of clearing proposed (30 hectares) in comparison with the extent of the Port Headland coastal catchment area (which is approximately 65,000 hectares) is unlikely to result in deterioration in the quality of groundwater.

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

Methodology

- Straits (2007).
 GIS Database:
 - Groundwater Salinity, Statewide - DOW.
 - Hydrographic Catchments - Catchments - DOW.

- Hydrographic Catchments - Subcatchments - DOW.
- Public Drinking Water Source Areas (PDWSAs) - DOW.
- Topographic Contours, Statewide - DOLA 12/09/02.

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

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

The limited amount of clearing proposed (30 hectares) in comparison with the extent of the Port Headland coastal catchment area (which is approximately 65,000 hectares) (GIS Database) is unlikely to result in incremental increases in peak flood height or flood peak duration.

The mean annual rainfall for the area is 400 millimetres, while the evaporation of the area is at around 3,500 millimetres per year (GIS Database). Therefore, it is unlikely that the proposed clearing will cause or exacerbate the incidence or intensity of flooding.

The WCCM is subject to intense rainfall events, predominantly associated with cyclonic activity. It is not anticipated that the clearing relating to this Purpose Permit will have a significant impact on the intensity of flooding during such events (Straits, 2007). In addition, drainage control will be considered as part of the normal planning process associated with development works at the site (Straits, 2007).

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

Methodology Straits (2007).
GIS Database:

- Evaporation Isopleths - BOM 09/98.
- Hydrographic Catchments - Catchments - DOW.
- Hydrographic Catchments - Subcatchments - DOW.
- Rainfall, Mean Annual - BOM 30/09/01.

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

Comments

The WCCM lies within the traditional lands of the Ngarluma people, who have had joint determination of the Native Title over the area with the Yindjibarndi people. In October 1997 Straits established a Community Assistance Agreement in order to foster cultural and social development of the local Ngarluma and Yindjibarndi People (Straits, 2007). The mining lease has been granted, and the clearing is for a purpose consistent with the lease, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

The Department of Indigenous Affairs (DIA) Heritage Register identifies the buffer zones of three registered sites that lie partly or wholly within tenement M47/238 (GIS Database). The key operational areas lie within the registered ethnographic site associated with Mons Cupri Hill - the site of the freshwater turtle. This area underwent a Section 18 clearance, and was subsequently approved for disturbance in 1997 (Straits, 2007).

Numerous heritage surveys have been conducted for the WCCM, however, no items of archaeological significance have been identified within M47/238.

No relevant Environmental Impact Assessments have been conducted around the survey area.

Methodology Straits (2007).
GIS Database:

- Aboriginal Sites of Significance - DIA.
- Environmental Impact Assessments.
- Native Title Claims - DLI 7/11/05.

4. Assessor's recommendations

Purpose	Method	Applied area (ha)/ trees	Decision	Comment / recommendation
Mineral Production	Mechanical Removal	30	Grant 30 hectares	<p>The proposal has been assessed, and it has been determined that the proposed clearing is likely to be at variance to principles (b) and (f). The proposed clearing is not likely to be at variance with principles (a), (c), (d), (g), (h), (i) and (j). The proposed clearing is not at variance with principle (e). The assessing officer recommends that the permit be granted subject to the following conditions:</p> <ol style="list-style-type: none"> The Permit Holder shall record the following for each instance of clearing: <ol style="list-style-type: none"> the location of where the clearing occurred, expressed as grid coordinates using the Geocentric Datum of Australia 1994 coordinate system; the size of the area cleared in hectares; the dates on which the area was cleared;

- d) the area rehabilitated in hectares;
- e) the method of clearing;
- f) the purpose of clearing.

2. The Permit Holder shall provide a report to the Director, Environment, Department of Industry and Resources by 30 September 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 September and 31 August the previous year. This report can be included as an addendum to the Annual Environmental Report.

3. The Permit Holder shall avoid disturbing *Corymbia hamersleyana* where possible. If clearing does take place, the Permit Holder shall collect seeds to be used for rehabilitation.

5. References

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- Department of Natural Resources and Environment (2002) *Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local*. Department of Natural Resources and Environment, Victoria.
- ENV Australia (2006) *Whim Creek Fauna Assessment Phase II*, unpublished report prepared for Straits (Whim Creek) Pty Ltd, Perth, WA.
- Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Kendrick P. and McKenzie N (2001) *Pilbara 1 (PIL 1- Chichester subregion) in : "A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002"*. Published by the Department of Conservation and Land Management.
- Onshore Environmental Consultants (2006) *Total flora recorded from the Whim Creek survey area*, unpublished report prepared for Straits (Whim Creek) Pty Ltd, Western Australia.
- Pizzey, G. and Knight, F. (1997) *Field guide to the Birds of Australia*, Angus and Robertson, Sydney, Australia.
- Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) *Native Vegetation in Western Australia, Extent, Type and Status*. Resource Management Technical Report 249. Department of Agriculture, Western Australia.
- Straits (Whim Creek) Pty Ltd (Straits) (2007) *Application for a Clearing Permit (Purpose Permit) For M47/238 at the Whim Creek Copper Mine*, unpublished report, Western Australia.
- Van Vreeswyk, A.M.E., Payne, A.L., Leighton, K.A. and Henning, P. (2004) *An inventory and condition survey of the Pilbara region, Western Australia*, Technical Bulletin No.92, Department of Agriculture, Western Australia.

6. Glossary

Acronyms:

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