Department of Industry and Resources

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 1704/1
Permit type: Area Permit

1.2. Proponent details

Proponent's name: **Iluka Resources Ltd**

1.3. Property details

Property: AM70/267
Local Government Area: Shire Of Carnamah
Colloquial name: Mining Lease 267SA (AM 70/267) Mineral Sands (Eneabba) Agreement Act 1975

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
178		Mechanical Removal	State Agreement

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
Beard vegetation associations have been mapped at a 1:250 000 scale for the whole of Western Australia, and are useful to look at vegetation extent in a regional context. Two Beard vegetation associations are located within the areas proposed to be cleared. These are: 49: Shrublands; mixed heath. 379: Shrublands; scrub-heath on lateritic sandplain in the central Geraldton Sandplain Region (GIS Database). The areas proposed to be cleared were surveyed in more detail by Woodman (2006a) at a scale of 1:5000 in July 2006, and at a scale of 1:3000 in October 2006. A total of 13 plant communities were mapped within areas surveyed in July 2006 (Woodman Environmental Consulting, 2006a). These are: WOODLANDS: W2: Woodland of *Eucalyptus accedens* and occasional *Eucalyptus pleurocarpa* on brown sandy-loam with some lateritic gravel. W5: Low Woodland of *Eucalyptus todtiana* over mixed tall shrubs on grey sand. W6: Open Low Woodland of *Eucalyptus todtiana* and *Banksia* spp. on grey sand. W8: Very Open Low Woodland of *Eucalyptus todtiana* and *Eucalyptus pleurocarpa* over low shrubs.	Iluka Resources Ltd are proposing to mine and re-mine sections within South Tails area, situated within the South Mine at Eneabba. The proposed clearing is for the purpose of mining mineral sands. The areas proposed to be cleared include 46 hectares of previously uncleared vegetation, as well as 132 hectares of rehabilitated vegetation (totalling 178 hectares). Iluka will also mine open areas, which are not yet rehabilitated following previous disturbance.	Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994) To Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery, 1994)	The vegetation condition is based on information provided by Iluka Resources Ltd (2006) and previous site visits. Disturbance from previous mining is evident. Three detailed surveys have been conducted over the proposed clearing area. A survey was conducted in July 2006, which aimed to map the plant communities present within the proposed clearing area (Woodman Environmental Consulting, 2006a). This survey identified a total of 13 plant communities (Woodman Environmental Consulting, 2006a). An additional survey was completed in October 2006, which aimed to identify the Declared Rare and Priority Flora in the proposed clearing area (Woodman Environmental Consulting, 2006b). The third survey was conducted to assess the rehabilitated mining areas in South Tails expansion areas (Mattiske Consulting Pty Ltd, 2006). The findings of that survey were that rehabilitation should be successful if completed as per Mattiske Consulting Pty Ltd (2006) recommendations. Iluka Resources Ltd have committed to rehabilitating those areas proposed to be cleared to native vegetation (locally native vegetation resulting from rehabilitation activities) and pasture where appropriate, using techniques that have been followed for previous rehabilitation of mined areas (Iluka Resources Ltd, 2006).

W11: Very Open Shrub Mallee of *Eucalyptus pleurocarpa* over a Low Heath of mixed shrubs on brown sandy-clay.

SHRUBLANDS:

S6: Shrubland dominated by *Eucalyptus pleurocarpa*, *Allocasuarina humilis*, *Xanthorrhoea preissii* and *Jacksonia floribunda* on grey sand.

S11: Dense Shrubland with occasional *Eucalyptus pleurocarpa* on grey sand with some lateritic gravel.

S12: Low Shrubland dominated by *Banksia leptophylla*, with emergent *Xylomelum angustifolium*, *Banksia attenuata* and *Banksia candolleana* on grey sand.

S14: Low Shrubland, with occasional emergent *Eucalyptus todtiana* and *Eucalyptus pleurocarpa*, on grey sand.

S19: Low Open Shrubland dominated by *Banksia attenuata* over *Ecdeiocolea monostachya* on brown sandy-clay.

HEATHS ON SAND:

SH2: Heath of mixed shrubs dominated by *Xanthorrhoea preissii*, *Melaleuca systena*, *Lambertia mulitiflora* var *multiflora* and *Hibbertia hypericoides* on grey sand.

SH9: Low Heath of mixed shrubs over sedges dominated by *Chordifex sinuosus* and *Ecdeiocolea monostachya* on brown sandy-clay.

HEATHS ON LATERITE:

LH3: Heath dominated by *Xanthorrhoea drummondii* on heavy laterite on upper slopes.

In response to the Environmental Protection Authority's (EPA) intention to formally assess the clearing proposal, Iluka Resources Ltd have agreed to remove a total of 29 hectares from the proposed clearing. This includes 100% of vegetation communities S19 and SH9, and 90% of the restricted community W11.

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 may be at variance to this Principle

The proposed clearing area is located in the Geraldton Sandplains Interim Biogeographic Regionalisation of Australia (IBRA) Bioregion, and the Lesueur Sandplain GS3 IBRA subregion, which falls within the Bioregion Group 1 classification of EPA guidance statement no. 3 (2002) (GIS Database; Bancroft and Bamford, 2006). The biodiversity values of that area have been summarised by Desmond and Chant (2001). The proposed clearing area is situated within "kwongan" area, a locally and internationally recognised area of high biological diversity with a high degree of endemism. Two vegetation surveys in the South Tails area identified a total of 224 vascular plant species, belonging to 34 plant families (Woodman Environmental Consulting, 2006a, 2006b). Thirteen plant communities were mapped within the South Tails area (Woodman Environmental Consulting, 2006a). No live Declared Rare Flora (DRF) and 26 Priority listed flora species were found during the July and October 2006 surveys (Woodman Environmental Consulting, 2006a, 2006b). This suggests the area has high speciation and diversity, and is important for continued existence of priority flora species.

The South Tails proposed clearing area is located within the Tathra Vegetation System, as described by Beard (1976) (Iluka Resources Ltd, 2006). Three conservation reserves, the South Eneabba Nature Reserve, Tathra National Park and Reserve 29806 are located within the Tathra System. The regional representation of the

plant communities from the South Tails survey area within the conservation reserve is unknown, although it is likely that similar broad vegetation types are present within Tathra National Park, South Eneabba Nature Reserve and Reserve 29806 (Iluka Resources Ltd, 2006).

From previous studies and known records, up to 30 species of vertebrates that are of conservation significance may occur in the Eneabba region. Clearing of South Tails is not expected to have a regional impact on any of the 30 species.

Iluka Resources Ltd has an established track record in successfully rehabilitating land. Approximately 2,000 hectares of land affected by mineral sand mining have been rehabilitated by Iluka Resources Ltd at the Eneabba Operations. Rehabilitated areas are the subject of an on-going biological monitoring program (Mattiske Consulting Pty Ltd, 2006).

There is a high level of speciation and endemism within the vegetation proposed to be cleared and this vegetation may provide habitat for conservation significant fauna species. Following clearing and mining, these values will be diminished short-term, until vegetation in the area is rehabilitated.

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

Methodology

Bancroft and Bamford (2006).
Desmond and Chant (2001).
EPA (2002).
Iluka Resources Ltd (2006).
Mattiske Consulting Pty Ltd (2006).
Woodman Environmental Consulting (2006a).
Woodman Environmental Consulting (2006b).
GIS Database
- IBRA (subregions) EA 18/10/2000.

(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 review of the fauna information that has been gained from previous studies at Iluka Resources Ltd's operations at Eneabba was undertaken in 2005 (Bancroft and Bamford, 2006). This review included a one day site inspection which occurred in October 2005 (Bancroft and Bamford, 2006). Trapping and surveys for vertebrate species have occurred at Eneabba since 1981, and studies focusing on invertebrates as an indicator of rehabilitation success since 1980. The Eneabba area has a long history of fauna investigations and the vertebrate fauna of the area has been well documented from various studies carried out as a part of Iluka Resources Ltd's operations or environmental approval requirements (Bancroft and Bamford, 2006). Similarly, the studies of the invertebrate fauna in the area are among the most extensive in Western Australia.

From previous studies and known records, 30 species of vertebrates that are of conservation significance may occur in the Eneabba area. This includes 2 reptiles, 27 birds and 1 mammal species. Many of the 30 species of fauna are unlikely to be present or only present as vagrants across the Eneabba and are not expected to be reliant on the South Tails area. Eight of the conservation significant birds are waterbirds, and given the limited wetland or aquatic habitats within the proposed clearing area, it is unlikely these species will impacted.

Other species that may possibly be impacted include:
Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*), Schedule 1 (fauna that is rare or likely to become extinct), forages on heathland vegetation and has been recorded in the vicinity of the Eneabba mine. There appears to be a lack of apparent suitable breeding habitat, either on the lease or sufficiently close, for breeding birds to rely solely on the lease for foraging (Iluka Resources Ltd, 2006). A preliminary reconnaissance survey of the Eneabba mine site was undertaken in September 2006 by consultant ornithologist for Iluka Resources Ltd, which suggested that no suitable nesting sites occur within the mining lease. However, the South Tails area is still an important food source, given the land clearing which has occurred in the area. Short term impacts are expected, however, rehabilitation will bring these food sources back, therefore no long term impacts are expected.

The Peregrine Falcon (*Falco peregrinus*) is a Schedule 4 (fauna in need of special protection) species that may occur sporadically in the vicinity of the Eneabba mine but is unlikely to be solely reliant on the proposed clearing areas (Iluka Resource Ltd, 2006). The Peregrine Falcon is cosmopolitan but uncommon throughout Australia, and prefers to inhabit sites that provide tall perching structures such as cliffs, gorges, timbered watercourses, and tall man-made structures such as power-poles and buildings (Iluka Resources Ltd, 2006). This species is unlikely to be affected by the proposed activity.

The Rainbow Bee-Eater (*Merops ornatus*) and Fork-Tailed Swift (*Apus pacificus*) are classified as migratory birds under the Japan Australia Migratory Bird Agreement (JAMBA), the China Australia Migratory Bird Agreement (CAMBA) and The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention). Bird species listed under JAMBA are also protected under Schedule 3 of the WA *Wildlife*

Conservation Act 1950. The Rainbow Bee-Eater is a common breeding resident in northern Australia and a summer breeding migrant to southeast and southwest Australia (Pizzey and Knight, 1998, as cited in Iluka Resources Ltd, 2006). The Rainbow Bee-Eater is an opportunistic species known to inhabit a wide range of habitats (Pizzey and Knight, 1998 as cited in Iluka Resources Ltd, 2006). It is an aerial feeder and is not likely to be directly impacted (M. Bamford pers.comm as cited in Iluka Resources Ltd, 2006).

The Fork-tailed Swift is a regular summer migrant throughout WA (Pizzey and Knight, 1998 as cited in Iluka Resources Ltd, 2006). Although reported roosting on cliffs and large trees it prefers open country where it is an aerial feeder rarely landing, and known to spend nights on wing (Pizzey and Knight, 1998 as cited in Iluka Resources Ltd, 2006). The Fork-tailed Swift populations are unlikely to be affected by the proposal.

Iluka Resources Ltd's review of historic pit trapping data from detailed invertebrate surveys conducted at Eneabba over the last 25 years in both native vegetation and rehabilitation areas yielded no recordings of either the Shield-backed Trapdoor Spider (*Idiosoma nigrum*) (Schedule 1) or the Scorpio Fly *Mecopteran Austromerope poultoni* (listed by DEC as Priority 2).

The Rufous Fieldwren (*Calamanthus campestris montanellus)* is a priority sub-species, listed on DEC's own priority list as Priority 4. It is a species that inhabits very low heath; has previously been recorded at Eneabba; and is likely to be a permanent and widespread resident species. Although this species is likely to disappear from the directly impacted area for 2-3 years following the clearing and mining activities, there is a significant proportion of remaining habitat in the general area to support the displaced birds. This bird has been found to recolonise rehabilitation very well (M. Bamford pers.comm. as cited in Iluka Resources Ltd, 2006). Iluka Resources Ltd's historic and ongoing rehabilitation initiatives at Eneabba are important for this species and any long term impacts are unlikely.

Previous DEC advice provided for the nearby Adamson A and B proposals has stated that if the clearing is carried out in an incremental manner and actively rehabilitated directly after the cessation of mining activities, the proposal is unlikely to have a major impact on the local fauna (DEC, 2005).

Clearing of South Tails is not expected to have a regional impact on any of the 30 species of vertebrates that are of conservation significance and may occur in the Eneabba area.

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

Methodology

Bancroft and Bamford (2006).
DEC (2005).
Iluka Resources Ltd (2006).

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

Comments

Proposal may be at variance to this Principle

The proposed clearing area is situated within 'kwongan' area, a locally and internationally known area of high biological diversity with a high degree of endemism. Twelve Declared Rare Flora (DRF) species are known from the Eneabba area and therefore have the potential to be present in the South Tails survey area (Iluka Resources Ltd, 2006). These are:

- *Eucalyptus crispata*
- *Eucalyptus johnsoniana*
- *Eucalyptus rhodantha* var. *rhodantha*
- *Eucalyptus suberea*
- *Grevillea althoferorum*
- *Grevillea curviloba* subsp. *incurva*
- *Leucopogon obtectus*
- *Paracaleana dixonii* ms
- *Stawellia dimorphantha*
- *Tetratheca nephelioides* ms
- *Thelymitra stellata*
- *Verticorda albida* (Woodman Environmental Consulting, 2006b).

Of these twelve species, three (*Eucalyptus crispata*, *Grevillea althoferorum* and *Grevillea curviloba* subsp. *incurva*) are unlikely to be found in the clearing proposal, due to soil habitat requirements. *Stawellia dimorphantha* may be present, but the species is difficult to detect due to its habitat and similarity to other species. The orchid species, *Thelymitra steallata*, requires fire to regenerate from rootstock. As the South Tails area has not experienced fire in many years, the likelihood of locating this species is very low.

During the July and October 2006 survey one dead DRF plant (*Leucopogon obtectus*) was recorded in the South Tails areas. Intensive searching for the 12 species of DRF known from the Eneabba region was carried out within the South Tails remnants in October 2006, with none found.

DEC advice (2007) indicates that the 2006 flowering season was poor, and that the proponent is strongly

encouraged to conduct follow-up surveys for the orchid species *Paracaleana dixonii*.

A total of 26 Priority flora species were recorded. All are known to occur in the Eneabba region, and, with the exception of *Acacia lasiocarpa* var. *lasiocarpa* Cockleshell Gully variant, all have been previously recorded elsewhere on the Iluka's leases. *Acacia lasiocarpa* var. *lasiocarpa* Cockleshell Gully occurs within plant community W8, which has also been mapped over large sections of the IPL North and Adamson lease areas. It is likely that this taxon is also present within those areas.

Given that an intensive search failed to find any DRF species within the proposed area to be cleared, it is unlikely that any DRF will be impacted by the proposed clearing. Significant habitat necessary for the continued existence of priority listed flora species in-situ will be affected by the proposed clearing of the South Tails area, however, it is not expected to have significant long term impacts on species.

The proposed clearing will only impact on local populations of Priority Flora, but the impact is unlikely to be significant regionally, as these species are all represented on Iluka Resources Ltd leases (Iluka Resources Ltd, 2006). Of the 26 Priority species known to occur in the native vegetation in the Iluka Resources Ltd leases, 20 have been recorded in areas previously mined and rehabilitated (Iluka Resources Ltd, 2006).

The proposed clearing area is not necessary for the continued in situ existence of significant habitat for the 26 Priority species found within the clearing area, as these species are represented elsewhere within Iluka Resources Ltd's leases, and most likely in the conservation estate located nearby.

During the Environmental Protection Authority (EPA) referral process, Iluka Resources Ltd has changed the current proposal by removing the following areas from the proposal:
- 16 hectares located in the South Eneabba Nature Reserve, comprising of vegetation communities W2, S11, S14 and LH3;
- 100% of restricted vegetation community S19 (0.9 hectares), located on Vacant Crown Land;
- 100% of restricted vegetation community SH9 (1.4 hectares), located on Vacant Crown Land
- 90% of restricted vegetation community W11 (10.7ha) located on Vacant Crown Land.

This has lead to the reduction in the number of priority flora affected by this proposal. Of the 23 species that may be affected by the revised proposal, 18 have been previously recorded in the rehabilitation areas. The 5 species which have not been recorded in rehabilitation areas to date are:
- *Calytrix superba* (P3)
- *Comesperma acerosum* (P3)
- *Daviesia epiphyllum* (P3)
- *Haemodorum loratum* (P3)
- *Verticordia fragrans* (P3)

The total number of those priority plants taken under this proposal will be:
- *Calytrix superba* (5)
- *Comesperma acerosum* (15)
- *Daviesia epiphyllum* (8)
- *Haemodorum loratum* (3)
- *Verticordia fragrans* (6)

All of these species occur in the Eneabba region, inside and outside of the Iluka leases (Iluka Resources Ltd, 2006), and it is unlikely the impact on these species will be significant.

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

Methodology DEC (2007)
Iluka Resources Ltd (2006).
Woodman Environmental Consulting (2006b).

(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

The closest known endorsed Threatened Ecological Community (TEC) is the State listed type 72 Ferricrete floristic community (Rocky Springs type), located approximately 4.1 kilometres west of the proposed clearing area (GIS Database).

Woodman Environmental Consultants (2006a) states that none of the plant communities mapped and surveyed are TECs.

The distance between the TEC and the areas proposed to be cleared is such that detrimental effects resulting from the proposed clearing are unlikely.

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

Methodology Woodman Environmental Consulting (2006a).
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 may be at variance to this Principle

The South Tails area is situated within the Lesueur Sandplain Interim Biogeographic Regionalisation of Australia (IBRA) subregion (Shepherd *et al*., 2001). Up to 40.9% of native vegetation cover remains within this subregion, and the clearing of South Tails area will not reduce the remaining native vegetation cover to less than 30% within the IBRA subregion, as is considered below the 'threshold level' by the EPA (2000).

The two Beard vegetation associations located within the areas proposed to be cleared are: 49 (Shrublands; mixed heath) and 379 (Shrublands; scrub-heath on lateritic sandplain in the central Geraldton Sandplain Region) (GIS Database). Approximately 37.0% of Beard vegetation association 49 remains of its pre-European extent, while only 26.7% of Beard vegetation association 379 remains within the IBRA subregion (Shepherd *et al*., 2001) (see table below).

Clearing of South Tails represents approximately 0.007% of the Geraldton Sandplain vegetation (Iluka Resources Ltd, 2006).

	Pre-European area (ha) *	**Current extent (ha)***	**Remaining % ***	**Conservation status**	**% in reserves/ CALM managed lands ***
IBRA Subregion					
- Lesueur Sandplain	1,171,805***	478,987***	40.9%	Depleted	41.4%
- Shire of Carnamah	290,750***	112,511***	38.7%	Depleted	Not Available
Beard vegetation Association					
- 49	33,141	12,273	37.0%	Depleted	22.2%
- 379	370,097	98,744	26.7%	Vulnerable	18.7

* Shepherd *et al.* (2001)
** Department of Natural Resources and Environment (2002)
*** Area within the Intensive Landuse Zone

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**

Thirteen vegetation communities were recorded by Iluka Resources Ltd (2006) in the area proposed to be cleared. The vegetation communities are likely to be present within the South Eneabba and other Nature Reserves (Iluka Resources Ltd, 2006).

Based on the National Objective Targets for Biodiversity Conservation 2001-2005 (Department of Natural Resources and Environment, 2002), the extent of vegetation type 379 left within the Lesueur Sandplain IBRA subregion is classified as 'vulnerable'.

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

Methodology EPA (2000).
Department of Natural Resources and Environment (2002).
Iluka Resources Ltd (2006).
Shepherd *et al*. (2001).
GIS Database:
- Interim Biogeographic Regionalisation of Australia.
- Pre European Vegetation DA 01/01.

(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 not likely to be at variance to this Principle

According to available databases, a small 'lake' occurs partly within the application area (GIS Database).

Recent aerial photography and photographs of the area indicate that the 'lake' is merely a 'sump', and has experienced disturbance due to a road, power line, rail and groundwater monitoring bore (Iluka Resources Ltd, 2006). None of the vegetation types occurring in South Tails proposed clearing areas are growing in or are associated with wetlands or watercourses (Woodman Environmental Consulting, 2006a). In fact, the 'sump' is largely devoid of vegetation and Iluka Resources Ltd have advised that the 'sump' is usually dry, and only contains water in extreme rainfall events (Iluka Resources Ltd, 2006).

The nearest watercourse to the proposed clearing area is located 130 metres north of the proposal. This is a non-perennial watercourse, and it is unlikely it will be affected by this proposed clearing.

The groundwater is situated below the level of the mining operation and dewatering is not required (Iluka Resources Ltd, 2006). Drainage mechanisms are put in place during operations and rehabilitation to control water flows (Iluka Resources Ltd, 2006). The clearing proposal is unlikely to affect any wetland or watercourse.

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

Methodology

Iluka Resources Ltd (2006).
Woodman Environmental Consulting (2006a).
GIS Database:
- 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 area to be cleared rises gently from west to east (GIS Database). The soils are grey sands and the area is subject to strong sea breezes in summer. Guidelines developed by the former Department of Agriculture (Wells and King, 1989) with regards to soil erosion caused by water indicated that the South Tails has high capability, and that with careful planning soil erosion can be successfully managed.

Guidelines with regards to soil erosion caused by wind (Wells and King, 1989) indicate that this area has a capability class of IV, which allows clearing with wind protection. Careful planning will be required to avoid wind erosion problems at the site. To minimise the potential for wind erosion as well as minimise the potential for dust issues to occur, the top soil stockpiles and other open areas are routinely stabilised by Iluka Resources Ltd, using vegetation such as rye grass, native vegetation mulch, and glue on gravel. The process of clearing native vegetation starts with the cutting of the vegetation above ground level (native vegetation mulching) and leaving the plants root systems in place. Such a technique minimises the potential for wind erosion to occur. The mulched vegetation is then immediately used to cover recently reinstated areas and is an important component of the native vegetation rehabilitation process carried out on site.

Department of Agriculture and Food Western Australia (DAFWA) undertook a desk-top assessment of the clearing permit, and found that the proposal is unlikely to be at variance with this principle for soil erosion, as the risk is manageable as the proposed rehabilitation program post mining has proven to be highly successful.

Iluka Resources Ltd currently implements a number of measures to manage water and erosion as part of their operations (Iluka Resources Ltd, 2005), and compliance under the *Mineral Sands (Eneabba) Agreement Act 1975*. Drainage mechanisms are put in place during operations and rehabilitation to control water flows (Iluka Resources Ltd, 2005). Drainage design is considered in mine planning and controls include bunding cleared areas to ensure water runoff from disturbed areas is contained. Drainage design is also considered in rehabilitation and measures such as contour banks are installed as required.

As part of its reporting requirements under clause 8 of the *Mineral Sands (Eneabba) Agreement Act 1975*, Iluka Resources Ltd is required to submit detailed triennial reports that specifically address water quality surface water discharge, rehabilitation plans and monitoring. Officers of Department of Industry and Resources (DoIR), Department of Environment and Conservation (DEC) and Department of Water (DoW) inspect the operations at least once a year as a part of the Mineral Sands Agreement Rehabilitation Coordinating Committee (MSARCC) to review soil erosion and water management issues.

As the mining and rehabilitation process include drainage and water run-off controls, it is not foreseen that the proposed clearing will result in any significant land degradation.

Weed management is also part of the rehabilitation process on site and previous site visits do not indicate any serious issues in relation to weed or dieback management arising from current practices at the Eneabba operations.

A Dieback Management Plan exists for all Iluka Resources Ltd's operations at Eneabba. A revised version of that document aiming to incorporate current best practices has been reviewed by the DEC and has not been

finalised at this stage. Two clearing permit conditions have been stipulated for this permit in view of the comments on the draft Dieback Management Plan provided by DEC to Iluka Resources Ltd.

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

Methodology DAFWA (2007).
Iluka Resources Ltd (2005).
Wells and King (1989).
GIS Database:
- Topographic Contours, Statewide - DOLA 12/09/02.

(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 proposed clearing area is partly within the South Eneabba Nature Reserve (Flora and Fauna Reserve 31030) (GIS Database; Iluka Resources Ltd, 2006). A part of this reserve is on the register of National Estate (AHC, 2007). Mining has occurred within this reserve since the 1970's under the *Mineral Sands (Eneabba) Agreement Act 1975*. Therefore, it is unlikely that the proposed clearing will significantly impact on the value of the South Eneabba Nature Reserve. Conservation value is likely to be diminished in the short term, however, with rehabilitation, it is envisaged that the conservation value of the area will increase in the long term from what it is now.

During the Environmental Protection Authority (EPA) referral process, Iluka Resources Ltd has changed the current proposal by removing 16 hectares of previously uncleared land located in the South Eneabba Nature Reserve from the revised proposal. The revised clearing proposal will only occur within the previously mined areas.

Iluka Resources Ltd has an established track record in successfully rehabilitating land. Approximately 2,000 hectares of land affected by mineral sand mining have been rehabilitated by Iluka Resources Ltd at the Eneabba Operations. On-going biological monitoring program of these areas is also conducted (Mattiske Consulting Pty Ltd, 2006).

The area proposed to be cleared is located within a previously mined area. Due to its previously degraded state, it is unlikely that the proposed clearing area will impact the environmental values of the South Eneabba Nature Reserve.

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

Methodology AHC (2007).
Iluka Resources Ltd (2006).
GIS Database:
- 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 area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database). The whole of the Eneabba operations are subject to Licence 5656/7 under Part V of the *Environmental Protection Act 1986*. The licence provides controls over groundwater and surface water runoff water quality by requiring an annual report on water quality, quantity and result monitoring against Australian and New Zealand Environmental and Conservation Council (ANZECC) guidelines and previous results. Condition W2(b) (i-v) defines discharge limits (pH, salinity, turbidity, erosion and impacts on surrounding vegetation).

Groundwater at Eneabba is situated below the ore bodies and is not impacted by mining operations (Iluka Resources Ltd, 2006). Drainage mechanisms are put in place during operations and rehabilitation to control water flows (Iluka Resources Ltd, 2006).

As the areas applied to clear are located high in the landscape, acid sulphate soils are unlikely to be present within the area (GIS Database).

The proposed clearing areas are not classified as being in a Salinity Risk Area (GIS Database), therefore the proposed clearing is not likely to increase land salinisation in the area.

The area lies within an area where potential groundwater dependant ecosystems occur (GIS Database). The clearing is not expected to have long term impacts on other potential groundwater dependant ecosystems in the surrounding areas.

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

Methodology Iluka Resources Ltd (2006).
GIS Database:
- Acid Sulfate Soil Risk Map, Pilbara Coastline - DEC.
- Groundwater Salinity, Statewide - DOW.
- Potential Groundwater Dependant Ecosystems - DOE 2004.
- Public Drinking Water Source Areas (PDWSAs) - 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

There are no perennial watercourses located within the clearing permit area (GIS Database). At 120 metres above sea level (GIS Database), the proposed clearing area does not fall within a designated floodway or flood fringe area.

The information provided by Iluka Resources Ltd states that the 'sump' only contains water during significant rainfall events, and has not had any water for a number of years (Iluka Resources Ltd, 2006). In the event that water did occur, any surface water flows would be managed by drainage mechanisms that will be put in place during operations and rehabilitation to contain water flows (Iluka Resources Ltd, 2006). The clearing of vegetation is not expected to exacerbate or cause the incidence or intensity of flooding (Iluka Resources Ltd, 2006).

The average annual rainfall for the application area is approximately 510 mm (GIS Database). Average annual evaporation in the application area is approximately 2,400 mm (GIS Database). It is therefore expected that there would be little surface water flow during normal seasonal rains.

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

Methodology Iluka Resources Ltd (2006).
GIS Database:
- Topographic Contours, Statewide - DOLA 12/09/02.

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

Comments

A submission was received from the Shire of Carnamah, no objections were raised.

A submission raised concerns regarding the mining in the South Eneabba reserve, as well as raising the issue of the comprehensive Iluka Resources Ltd plan for the future of the area. A meeting was held between DoIR officers and Iluka Resources Ltd representatives, at which the Eneabba Operations approvals strategy was outlined. This strategy will involve a formal assessment of all proposed future mining. The benefits of this approach are:
- Removes the uncertainty and complexity in the current extent and scope of approvals which is unhelpful to both the government agencies and Iluka Resources Ltd:
- Less risk to Iluka Resources Ltd by having approvals for a longer planning horizon
- Holistic approach which:
  - Allows for consideration of impacts over life of mine;
  - Application of offsets for future mining in a larger package; and
  - Government and community input (Iluka Resources Ltd, 2007).

Another submission received raised four points, which are considered below:

1) That the clearing does not interfere with any Aboriginal Sites and be undertaken in compliance with the *Aboriginal Heritage Act 1972*.

Such issues cannot be addressed in the assessment of a clearing permit application, as they are not mentioned in the clearing principles listed in Schedule 5 of the *Environmental Protection Act 1986*. According to information available, there are no known Aboriginal Sites of Significance located within the clearing permit area (GIS Database). The submission is correct in stating that it is the proponent's responsibility to ensure compliance with the *Aboriginal Heritage Act 1972* and to ensure that no Aboriginal Sites of Significance are disturbed as a result of the clearing process.

2) Native vegetation is used by Aboriginal people for bush tucker and medicine, and the Eneabba area vegetation supports Emu populations which are hunted for sustenance. The social and cultural uses of land continue to this day and should be considered in the assessment because they fall within the definition of Environment under section 3(2) of the *Environmental Protection Act 1986*.

As for point 1 above, such issues cannot be addressed in clearing permit assessments, as they are not criteria which are outlined in the clearing principles listed in Schedule 5 of the *Environmental Protection Act 1986*.

3) That the current proposal is likely to be at variance with Clearing principle (e).

The assessor has assessed this application and determined that based on the size and nature of the vegetation proposed to be cleared, this proposal may be at variance to principle e. However, considering that mining has been occurring in the area since 1970's, and that Iluka Resources Ltd has a proven track record with rehabilitation, it is unlikely that the proposed clearing will have long term impacts on the area.

4) That a cumulative effects assessment be undertaken given the number of successive applications that have been lodged in this area and that consideration should be given to referring the whole proposal to the Environmental Protection Authority (EPA).

The nature of mineral sands operations is such that new or previously mined areas are cleared, mined and rehabilitated over a relatively short time period compared to other mineral extraction activities. The operations in the South Tail area do not involve a wet mining system and will not result in the formation of a permanent void or dredge pond. The rehabilitation activities carried out by Iluka at Eneabba are of a high standard and provided that such standards are maintained the likelihood of detrimental cumulative effects resulting from the clearing of native vegetation alone are not likely to be significant in relation to the clearing principles.

This Clearing Permit Application, as well as previous applications (CPS716/1, 1549/1) have been referred to the EPA. The EPA set the level of assessment as: "Not assessed, public advice given, assessed under Part V, clearing regulations" for this proposed clearing.

Following from discussions between the EPA, DoIR and Iluka Resources Ltd, Iluka Resources Ltd have committed to developing a Life of Mine (LOM) plan, and anticipated proposal which will examine cumulative impacts of clearing on native vegetation.

There are two Native Title Claims over the area under application (WC98_057 and WC04_002) (GIS Database). However, 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*.

Advice previously provided by the DEC for surrounding areas, in relation to the existing *Environmental Protection Act 1986* and water licenses that are currently in place at Iluka Resources Ltd Eneabba operations site did not raise any issues in relation to this clearing permit application (DEC, 2006). It is the proponent's responsibility to liaise with the DEC 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.

Mining at the Iluka Resources Ltd Eneabba operations is conducted under the *Mineral Sands (Eneabba) Agreement Act 1975*.

Methodology

DEC (2006).
Iluka Resources Ltd (2007).
GIS Database:
- Aboriginal Sites of Significance - DIA.
- Native Title Claims - DLI 7/11/05.

4. Assessor's recommendations

Purpose	Method	Applied area (ha)/ trees	Decision	Comment / recommendation
State Agreement	Mechanical Removal	178	**Grant 149 hectares**	Following from the EPA recommendations, the proposal is not likely to be at variance with principles (b), (d), (f), (g), (h), (i) and (j). The proposal may be at variance with principles (a), (c) and (e). However, while the community types are part of an area known for its high biodiversity, there are large areas of those community types remaining within the Iluka leases nearby and possibly in the nature reserves surrounding the proposed clearing area. Of the 23 species of priority flora which occur in the proposed clearing areas, 18 have been previously recorded in rehabilitation areas. The 5 priority species which have not been recorded in rehabilitation areas to date, have been previously recorded in the Eneabba region, inside and outside of the Iluka leases. The whole of the area to be cleared will be rehabilitated to locally native vegetation, as set under the Permit Conditions and the *Mineral Sands (Eneabba) Agreement Act 1975*. Previous rehabilitation efforts have proven successful and there is no reason to believe that the proposed clearing area cannot be successfully rehabilitated using the existing methods used by Iluka Resources. Iluka Resources Ltd are required to finalise their Dieback Management Plan as a matter of priority. The assessor has recommended conditions 4 and 5 as per the previous conditions on the same leases.

The assessor therefore recommends that the clearing permit be granted subject to the following conditions:

1. The Permit Holder shall not clear any native vegetation within the area cross hatched red on attached Plan CPS1704/1.

2. The Permit Holder shall retain the vegetative material and topsoil removed by clearing in accordance with this Permit.

3. The Permit Holder shall rehabilitate areas cleared under this permit to locally native vegetation.

4. As part of the rehabilitation of the areas cleared, the Permit Holder shall take the following measures:
   a) selectively remove or kill all plant species that are not native within the cleared site;
   b) sow the cleared site with a seed mixture consisting of local native species found within a 15km radius of the site; and
   c) the seed mixture shall be spread at a minimum rate of 1 kilogram per hectare.

5. The permit holder shall not allow any external soils, road base or vegetation on site unless tested free of *Phytophthora cinnamoni* contamination or sourced from a known *Phytophthora cinnamoni* free source.

6. All machinery and vehicles used during the clearing shall be cleaned of material that may be a source of *Phytophthora cinnamoni* contamination prior to entering the areas approved to clear.

5. References

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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.