Government of Western Australia
Department of Mines and Petroleum

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 2913/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **Pioneer Nickel Limited**

1.3. Property details

Property: Mining Lease 74/163
Local Government Area: Shire of Ravensthorpe
Colloquial name: Mt Chester North Prospect

1.4. Application

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

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. One Beard Vegetation Association has been mapped within the application area (GIS Database; Shepherd et al., 2001). **691:** Shrublands; *Dryandra quercifolia* & *Eucalyptus* spp. thicket. The application area was surveyed by Craig in October and November 2008 (Craig, 2008). The following four vegetation units were identified within the application area: **1. *Eucalyptus falcata/E. pleurocarpa*:** *Banksia lemanniana* associated with laterite on upper slopes and ridges. This community type is highly diverse and rich in proteaceous species. It is present in the area above the adit and intercepts some of the exploration lines. **2. *Eucalyptus flocktoniae*:** *Eucalyptus flocktoniae* plus numerous *Eucalyptus* species including *E. pileata, E. suggrandis, E. phenax* and *E. incrassata* grow on the slopes in colluviums. These mallee communities are generally associated with *Melaleuca hamata* and have a mid-dense to open understorey. **3. *Eucalyptus clivicola*:** *Eucalyptus clivicola* forms a narrow strip along the weak drainage that forms the western boundary of the exploration lines. *Siegfriedia darwinoides* and *Lasiopetalum compactum* are common understorey species. **4. *Eucalyptus flocktonia*:** *Melaleuca* sp. Gorse (AS George 7224) is present in a relatively small area on the access route between the two northernmost exploration lines. No species of introduced flora were recorded within the application area (Craig, 2008).	Pioneer Nickel Ltd has applied to clear up to 2.57 hectares of native vegetation for the purposes of mineral exploration and access tracks. Five drill pads will be cleared and these will be spaced approximately 100 metres apart. The area has been previously disturbed by historical mining and exploration activities.	Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994).	The vegetation condition was derived from a vegetation survey conducted by Craig (2008).

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 application area occurs within the Fitzgerald (ESP1) sub-region of the Esperance Bioregion of the Interim Biogeographic Regionalisation of Australia (IBRA) (GIS Database). This sub-region is characterised by myrtaceous and proteaceous scrub and mallee heaths on sand plains overlying Eocene sediments. Herbfields and heaths occur on abrupt granite tors and quartzite ranges that rise from the plain, while *Eucalypt* woodlands occur in the gullies and alluvial foot-slopes (CALM, 2002). The vegetation described within the application area is typical of the bioregion (Craig, 2008).

The application area is located within the Elverdton-Desmond area. The Elverdton-Desmond area and surrounds are one of the three areas of highest flora endemism in Western Australia, with more than 60 endemic species with a range of less than 30 kilometres (Craig, 2008). The application area is within the Ravensthorpe Range (Red Book System 3.8) (GIS Database). This area is recognised as an Environmentally Sensitive Area (ESA), and forms part of the Fitzgerald Biosphere, providing an important linkage between the Fitzgerald River National Park and crown land east of the vermin proof fence (GIS Database; Craig et al., 2007). The Ravensthorpe Range area has been listed by the Australian Heritage Council on the Register of National Estate as it contains many rare and endemic plant species and is the only natural locality of several *Eucalypts* (DEWHA, 2009).

The Ravensthorpe Range - Fitzgerald River National Park contains 75 endemic flora species and makes a significant contribution to the South Coast Region's biodiversity values (Danks, 2004). The plants of the South Coast Region belong to 756 genera in 146 families. Myrtaceae, Proteaceae, Papilionaceae, Epacridaceae, Mimosaceae and Orchidaceae families are particularly species rich and diverse within the area (Danks, 2004).

No introduced flora species (weeds) were recorded during the survey (Craig, 2008). To minimise the risk of introducing weeds into the application area, it is recommended that a condition be imposed on the permit for the purpose of weed management.

An area search of the Western Australian Museum's Faunabase conducted by the assessing officer suggests that the application area is diverse in avian and reptile species, particularly Skinks (20) (Western Australian Museum, 2009). The database search found 72 avian species from 28 families and 47 reptile species from 7 families as potentially occurring within the application area, or within a 50 kilometre radius of the application area.

Based on the above, the proposed clearing may be at variance to this Principle. However, the Ravensthorpe area has had a long history of exploration and mining (approximately 100 years) and as a result there has been considerable disturbance in the Elverdton-Desmond area. This is evident on aerial imagery in the form of historic grid lines and exploration tracks, which has impacted on the quality of the vegetation. Considering the relatively small size and disturbed nature of the application area, it is unlikely that the proposed clearing will compromise the diversity of the vegetation within the application area in the long term.

Methodology

CALM (2002)
Craig (2008)
Craig et al. (2007)
Danks (2004)
DEWHA (2009)
Western Australian Museum (2009)
GIS Database
- Clearing Regulations - Environmentally Sensitive Areas
- Interim Biogeographic Regionalisation of Australia

(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

The assessing officer has conducted a search of the Western Australian Museum's online fauna database between the co-ordinates 120.7002°E, 33.1397°S and 119.5807°E, 34.0708°S, representing a 50 kilometre radius around the application area.

This search identified 12 Amphibian, 25 Fish, 33 Mammalian, 47 Reptilian and 72 Avian species that may occur within the application area (Western Australian Museum, 2009). Of these, the following species of conservation significance have previously been recorded within the search area: Southern Death Adder (*Acanthophis antarcticus*), *Ctenotus gemmula*, Red Tailed Phascogale (*Phascogale calura*), Quenda (*Isoodon obesulus fusciventer*), Rufous Fieldwren (*Calamanthus campestris*), Recherche Cape Barren Goose (*Cereopsis novaehollandiae grisea*), Hooded Plover (*Charadrius rubricollis*), Brush Bronzewing (*Phaps elegans*), Crested Shrike Tit (*Falcunculus frontatus*) and the Western Rosella (*Platycercus icterotis*).

Pioneer Nickel Ltd (2006) conducted a desktop search of the Department of Environment and Conservation

(DEC) Threatened Fauna Database and the Department of the Environment, Water, Heritage and the Arts (DEWHA) protected matters search tool to identify species of conservation significance that had been recorded within the area specified. The co-ordinates used were similar to those used by the assessing officer above. In addition to those species listed above, the following fauna species of conservation significance were identified through this database search: *Lerista viduata*, Chuditch (*Dasyurus geoffroii*), Numbat (*Myrmecobius fasciatus*), Dibbler (*Parantechinus apicalis*), Heath mouse (*Pseudomys shortridgei*), Western Brush Wallaby (*Macropus irma*), Western Mouse (*Pseudomys occidentalis*), Tammar wallaby (*Macropus eugenii derbianus*), Malleefowl (*Leipoa ocellata*), Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*), White-tailed Black Cockatoo (*Calyptorhynchus* sp.), Western Ground Parrot (*Pezoporus wallicus flaviventrus*), Western Bristlebird (*Dasyomis longirostris*), Shy Heathwren (*Hylacola cauta whitlocki*), Crested Bellbird (*Oreoica gutturalis gutturalis*), White-browed Babbler (*Pomatostomus superciliosus ashbyi*), White-bellied Sea-eagle (*Haliaeetus leucogaster*), Fork-tailed Swift (*Apus pacificus*), Great Egret (*Ardea alba*), Cattle Egret (*Ardea ibis*), Rainbow Bee-eater (*Merops ornatus*) and the Western Whipbird (*Psophodes nigrogularis oberon*).

Based on habitat requirements, the following species are most likely to occur within the application area:

The Chuditch (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008)* is known to have occupied a wide range of habitats from woodlands, dry sclerophyll forests, riparian vegetation, beaches and deserts (DEC, 2009a). The Chuditch now has a contracted range in south-western Australia, in areas dominated by sclerophyll forest or drier woodland and mallee scrub land (Serena & Soderquist, 2004). Given the large home ranges of the Chuditch, it is possible that the vegetation within the application area may provide suitable habitat for this species. However, the vegetation types are well represented throughout the bioregion and the small area proposed to clear (2.57 hectares) in relation to the size of the sub-region (1,572,329 hectares), indicates the proposed clearing is unlikley to impact on the availability of significant habitat for this species.

The Dibbler (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) typically occupies heath and mallee-heath vegetation communities, preferring dense, long unburnt coastal heath (DEC, 2009b). The vegetation within the application area may provide suitable habitat for this species, however given that the vegetation types are well represented throughout the bioregion and the small area proposed to clear (2.57 hectares) in relation to the size of the sub-region (1,572,329 hectares), indicates the proposed clearing is unlikley to impact on the availability of significant habitat for this species.

Malleefowl (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice,* 2008) are largely confined to arid and semi-arid woodland that is dominated by mallee eucalypts on sandy soils, with less than 430 millimetres of rainfall annually (DEC, 2009c). However, they can also occur in habitats of *Acacia*, paperbark, sheoak and other scrubs as well as *Eucalypt* woodland and coastal heaths with an abundant layer of leaf litter for use in nest mounds (Garnett & Crowley, 2000). It is unlikely that the application area would provide significant habitat for this species given the vegetation types are well represented within the bioregion, and the area proposed to clear is small (2.57 hectares) in relation to the size of the sub-region (1,572,329 hectares).

The Western Ground Parrot (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) lives in floristically diverse heath lands where it feeds on fruit, seeds and leaves (Environment, 2009a). The application area may provide suitable habitat for this species, however the last record of the Western Ground Parrot from the Ravensthorpe area was in 1987 (Pioneer Nickel Ltd, 2006). Therefore, it is unlikely that the vegetation within the application area provides significant habitat for this species.

The wheatbelt species of Western Rosella (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) is described as utilising woodland habitat (Garnett & Crowley, 2000). Threats include clearing for agriculture affecting availability of food and nesting hollows (Garnett & Crowley, 2000). This species has vast amounts of suitable habitat in the bioregion and due to the small size of the area proposed to clear (2.57 hectares) in relation to the larger sub-region (1,572,329 hectares), the proposed clearing is unlikley to impact on the availability of significant habitat for this species.

Lerista viduata (P4 - DEC Priority Fauna List) is a species of skink that shelters at the base of trees and shrubs in *Eucalypt* woodlands amongst the leaf litter or on loamy clay soils (Wilson & Swan, 2004). Few populations of this species have been recorded, however one population was located at nearby Kundip (Wilson & Swan, 2004). There is little information regarding the habitat requirements of this species, therefore the assessing officer is unable to determine with any certainty whether the vegetation within the application area is significant habitat for this species. The vegetation types within the application area are well represented throughout the bioregion and given the small size of the area proposed to clear (2.57 hectares) in relation to the size of the sub-region (1,572,329 hectares), it is unlikely that the application area provides significant habitat for this species.

The Western Mouse (P4 - DEC Priority Fauna List) prefers long unburnt vegetation on sandy clay loam or sandy loam (DEC, 2009d). Suitable habitat can be varied and includes sparse low shrub land, tall dense shrub land, sparse to dense shrub mallee and mid-dense woodlands, with all preferred habitats having patches of extremely dense vegetation (DEC, 2009d). The soils of the application area are generally sandy and clayey and may provide suitable habitat for this species. Given the small area proposed to clear (2.57 hectares) in relation

to the size of the subregion (1,572,329 hectares) it is unlikely that it would provide significant habitat for the Western Mouse.

Crested Bellbirds (P4 - DEC Priority Fauna List) inhabit the shrub layer of *Eucalypt* woodland, mallee, *Acacia* shrubland, *Triodia* hummock grassland, saltbush and heath, where they feed on insects and seeds (Environment, 2009b). The Crested Bellbird range has contracted towards the inland in south-western Australia, and it is possible that the mallees present in the application area may provide suitable habitat for this species. Given that the vegetation types are well represented within the bioregion and the area proposed to clear is small (2.57 hectares) in relation to the size of the sub-region (1,572,329 hectares), the proposed clearing is unlikley to impact on the availability of significant habitat for this species.

The White-Browed Babbler (P4 - DEC Priority Fauna List) lives in *Eucalypt* forests and woodlands, and forages on and near the ground for insects and seeds (Environment, 2009c). The vegetation within the application area may provide suitable habitat for this species. However, given that the vegetation types are well represented throughout the bioregion and the small area proposed to clear (2.57 hectares) in relation to the size of the sub-region (1,572,329 hectares), it is unlikely that the application area contains significant habitat for this species.

The Western Whipbird (P4 - DEC Priority Fauna List) occurs from the Stirling Range east to Munglinup and north to Lake Grace (Environment, 2009d). This species inhabits mallee and heath, with recent observations being recorded from Kundip (Pioneer Nickel Ltd, 2006). The vegetation within the application area may provide suitable habitat for this species, however given that the vegetation types are well represented throughout the bioregion and the small area proposed to clear (2.57 hectares) in relation to the size of the sub-region (1,572,329 hectares), the proposed clearing is unlikley to impact on the availability of significant habitat for this species.

The Crested Shrike-Tit (P4 - DEC Priority Fauna List) is endemic to Western Australia, south-west of a line between Geraldton and Point Culver (Serventy & Whittell, 2000). The Crested Shrike-Tit inhabits *Eucalypt* forest and woodland, favouring smooth barked *Eucalyptus diversicolor, E. wandoo, E. salmonophloia, E. rudis* and *Acacia acuminata* over rough barked species (Serventy & Whittell, 2000). The vegetation within the application area provides suitable habitat for this species, however given that the vegetation types are well represented throughout the bioregion and the small area proposed to clear (2.57 hectares) in relation to the size of the sub-region (1,572,329 hectares), the proposed clearing is unlikley to impact on the availability of significant habitat for this species.

The Tammar Wallaby (P5 - DEC Priority Fauna List) inhabits coastal scrub, heath, dry sclerophyll forest and thickets in mallee and woodland (DEC, 2009e). The vegetation within the application area may provide suitable habitat for this species, however given that the vegetation types are well represented throughout the bioregion and the small area proposed to clear (2.57 hectares) in relation to the size of the sub-region (1,572,329 hectares), the proposed clearing is unlikley to impact on the availability of significant habitat for this species.

Based on the above, the proposed clearing is not likely to be at variance to this Principle despite the possible presence of suitable habitat for various fauna species.

Methodology

DEC (2009a)
DEC (2009b)
DEC (2009c)
DEC (2009d)
DEC (2009e)
Environment (2009a)
Environment (2009b)
Environment (2009c)
Environment (2009d)
Garnett & Crowley (2000)
Pioneer Nickel Ltd (2006)
Serena & Soderquist (2004)
Serventy & Whittell (2000)
Western Australian Museum (2009)
Wilson & Swan (2004)

(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

According to available databases, no Declared Rare Flora (DRF) species occur within the application area (GIS Database). One population of *Marianthus villosus* (DRF) has been recorded approximately 0.21 kilometres north-east of the application area (GIS Database). One population of *Eucalyptus x bennettiae* (P4) has been recorded approximately 0.34 kilometres south of the application area (GIS Database).

A botanical consultant conducted a floristic survey of the application area on the 22 and 23 October and the 13 November 2008 (Craig, 2008). No species of DRF were recorded during the flora survey. Six Priority Flora

species were recorded during the flora survey, namely *Guichenotia apetala* (P1); *Acacia durabilis* (P3); *Microcorys pimelioides* (P3); *Banksia laevigata* (P4); *Siegfriedia darwinioides* (P4) and *Spyridium glaucum* (P4) (Craig, 2008). Two flora species of significance were also recorded during the flora survey, namely *Dampiera* sp. Ravensthorpe Range (GF Craig 6926) and *Eucalyptus* sp. Mt Chester globose (GF Craig 8482) (Craig, 2008).

Guichenotia apetala (P1) is a compact, much-branched shrub 0.15 - 0.4 metres high found on gravel and laterite (Western Australian Herbarium, 2009). This species has a known range of approximately 2 kilometres, with most collections being made from the laterite ridge in the vicinity of Mt Chester and Mt Desmond (Craig, 2008). This species has previously been recorded 25 times, with population sizes varying from occassional to frequent and abundant (Western Australian Herbarium, 2009). *G. apetala* was fairly common (300+ individuals) throughout the application area, however despite its apparent ability to regenerate well after disturbance, care must be taken to minimise soil disturbance for this short-range endemic (Craig, 2008).

Acacia durabilis (P3) is a slender, moderately open, spinescent shrub 0.7 - 2 metres high. It is found on rocky or lateritic clay, sandy clay and on stony ridges and hills (Western Australian Herbarium, 2009). Nine scattered individuals of *A. durabilis* were found within the application area, with four of them being on the southernmost exploration line (Line 13) (Craig, 2008). This species is restricted to the Ravensthorpe Range, being collected from 7 kilometres north of Ravensthorpe, and from Mt Desmond through to Kundip (Craig, 2008). *A. durabilis* has previously been recorded along the coast from Albany to Ravensthorpe with records indicating that 36 populations have been recorded, some with 1000+ individuals (Western Australian Herbarium, 2009). It is unlikely that the removal of nine individuals will significantly impact on the existence of this species.

Microcorys pimeleoides (P3) is a low shrub growing up to 1 metre tall with small leaves arranged in whorls of three (Western Australian Herbarium, 2009). This species was found to be growing in a localized area along and adjacent to the ridge track and in shrub heath above the adit within the application area (Craig, 2008). *M. pimeleoides* appears to be a disturbance opportunist with the majority of sub-populations occurring on or adjacent to disturbed tracks, old exploration lines or in open areas amongst heath (Craig, 2008). Records indicate that 26 populations *M. pimeleoides* have previously been recorded, some with 7000+ individuals (Western Australian Herbarium, 2009). While the proposed clearing is likely to impact approximately 20 individals it is possible that this disturbance will actually result in a localized increase in their population numbers (Craig, 2008).

Banksia laevigata subsp. *laevigata* (P4) is a non-lignotuberous shrub 1 - 3.5 metres high. It is found on rocky soils (spongolite, laterite) and on hills and the top of breakaways (Western Australian Herbarium, 2009). In the Ravensthorpe Range this pecies usually grows in widely spaced small patches of less than 0.5 hecatres (Craig, 2008). Thirty nine populations of *B. laevigata* subsp. *laevigata* have previously been recorded, with population sizes ranging up to 500+ individuals (Western Australian Herbarium, 2009). A small population of *B. laevigata* subsp. *laevigata* was recorded within the application area growing on a lateritic outcrop/breakaway approximately 70 metres north of the adit (Craig, 2008). This species grows in association with *Banksia lemanniana, Eucalyptus pleurocarpa, Beaufortia orbifolia* and *Taxandria spathulata*. This community type is considered to be vulnerable within the Ravensthorpe Range and is a Priority One Priority Ecological Community, therefore disturbance to this species should be minimised (Craig, 2008).

Siegfriedia darwinioides (P4) is a much branched spreading shrub 0.2 - 1 metres high. It is found on gravely loam or sandy soils and clay and flats and ridges (Western Australian Herbarium, 2009). This species is distributed between the Pallinup River and Starvation Boat Harbour, having a range of 180 kilometres (Craig, 2008). Over 580 individuals of *S. darwinioides* were recorded during the flora survey of the application area, therefore some of these would be removed during the proposed clearing. *S. darwinioides* is relatively common and widespread through the Ravensthorpe system, being collected from the Ravensthorpe Range, Mt Short, Bandalup Hill, Kundip as wellas the Eyre Range in the Fitzgerald River National Park (Craig, 2008). The proposed clearing is unlikely to significantly impact on the existence of this species.

Spyridium glaucum (P4) is an erect or spreading shrub 0.5 - 1 metres high and is found on clay soils (Western Australian Herbarium, 2009). More than 110 individuals of *S. glaucum* were recorded during the flora survey of the application area. This species is known from numerous localities in the Ravensthorpe Range, from Mt Short to Kundip, having a range of 30 kilometres (Craig, 2008). Thousands of plants are known to grow in gullies north of Kundip mining leases and it is also known from Bandalup Hill where over 15,000 plants grow in three sub-populations covering over 2 hectares (Craig, 2008). The proposed clearing is unlikely to significantly impact on the habitat required for the continued existence of this species.

Dampiera sp. Ravensthorpe Range (GF Craig 6926) is a shrub with multiple, wire-like, flexible stems (up to 40 centimetres long) growing from the base with deep blue-purple flowers (Craig, 2008). This taxon grows in red-brown sandy loam in rock fissures and over shallow laterite (Craig, 2008). Collections have been made at a number of locations through the Ravensthorpe Range, extending from north-west of Mt McMahon to Mt Chester, a distance of approximately 11 kilometres (Craig, 2008). In the application area, one clump of *Dampiera* sp. Ravensthorpe Range (GF Craig 6926) was found in a relatively open area above the adit and another two clumps were found within the the alternative access route that heads in a north-east direction from the Amoco baseline. These are currently the most southern known populations of this species (Craig, 2008).

Eucalyptus sp. Mt Chester globose (GF Craig 8482) is a mallee which has globose fruits similar to *Eucalyptus falcata* but much larger (Craig, 2008). These mallees may be hybrids between *E. falcata* and *E. flocktoniae*,

both of which occur nearby, or it may be a new entity (Craig, 2008). Until further knowledge is gained about this species it is preferable that it remain undisturbed.

Based on the above, the proposed clearing may be at variance to this Principle. It is recommended that should a permit be granted, a condition be imposed on the permit with regard to stockpiling of all cleared topsoil and vegetation for rehabilitation purposes.

Methodology Craig (2008)
Western Australian Herbarium (2009)
GIS Database
- Declared Rare and Priority Flora List

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

Comments **Proposal may be at variance to this Principle**
A search of available databases reveals that there are no Threatened Ecological Communities (TEC's) within the application area (GIS Database; Craig, 2008).

The vegetation communities of the Elverdton-Desmond area lie within the Ravensthorpe System of Beard, which has been proposed for inclusion in CALM's (now Department of Environment and Conservation) TEC database (Craig, 2008). Within the Ravensthorpe System five vegetation communities are recognised as being ecosystems at risk;

- Proteaceous heath thickets of the Ravensthorpe Range laterite upland;
- Mallee woodlands of breakaway slopes of Ravensthorpe Range;
- *Eucalyptus* spp. on red loams on lower foothills of the eastern Ravensthorpe Range;
- Pale grey sand ridge magnesite - *Eucalyptus purpuratalow* forest on ridgetops and upper slopes; and
- Unique mallee on magnesite ridges west of Bandalup Hill (Craig, 2008).

The Priority Ecological Community (PEC) *Banksia laevigata - Banksia lemanniana* proteaceous thicket occurs on laterised ridges and breakaways (Craig, 2008). Species associated with this PEC include; *Eucalyptus pleurocarpa, Adenanthos oreophilus, Leptospermum maxwellii, Beaufortia orbifolia, Taxandria spathulata* and *Stylidium albomontis*. This Priority 1 PEC was recorded on the ridge track within the application area (Craig, 2008). The proposed clearing will impact on the PEC as some clearing/slashing of the *Beaufortia orbifolia* will be required to widen the track to gain access to the exploration lines, however no extra disturbance is expected where the existing track traverses the community (Craig, 2008).

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

Methodology Craig (2008)
GIS Database
- Threatened Ecological Communities

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Comments **Proposal is not at variance to this Principle**
The application area falls within the IBRA Esperance Bioregion (GIS Database). Shepherd et al. (2001) report that approximately 51.1% of the pre-European vegetation still exists in this Bioregion. The vegetation in the application area is recorded as Beard Vegetation Association 691: Shrublands; *Dryandra quercifolia* & *Eucalyptus* spp. thicket (GIS Database; Shepherd et al., 2001). According to Shepherd et al., (2001) there is approximately 96.6% of this vegetation type remaining within the Bioregion (see table below).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves (and post clearing %)
IBRA Bioregion – Esperance	2,899,944	1,483,240	~51.1%	Least Concern	~28.4% (~54%)
Local Government – Ravensthorpe	1,355,762	865,382	~63.8%	Least Concern	N/A
Beard veg assoc. – State					
691	45,589	34,951	~76.7%	Least Concern	~65.8% (~82.7%)
Beard veg assoc. – Bioregion					
691	35,491	34,274	~96.6%	Least Concern	~84.5% (~84.3%)
Beard veg assoc. - subregion					
691	35,491	34,274	~96.6%	Least Concern	~84.5% (~84.3%)

* Shepherd et al. (2001) updated 2005
** Department of Natural Resources and Environment (2002)

The vegetation within the application area is not a significant remnant of native vegetation within an area that has been extensively cleared.

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

Methodology Department of Natural Resources and Environment (2002)
Shepherd et al. (2001)
GIS Database
- Interim Biogeogaphic Regionalisation of Australia - Bioregions
- Pre-European Vegetation

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Comments

Proposal is at variance to this Principle

According to available GIS datasets, there are no known perennial watercourses or water bodies within the application area. There are numerous minor, non-perennial watercourses running in a south-westerly direction through the application area, which would occasionally flow during heavy rainfall events (GIS Database).

The application area experiences an average annual rainfall of approximately 426.6 millimetres according to the nearest recording station at Ravensthorpe, located approximately 8 kilometres to the west-north-west (Bureau of Meteorology, 2009). The application area also experiences an average annual pan evaporation rate of approximately 1987 millimetres (Luke et al., 1987).

It is the proponent's responsibility to liaise with the Department of Water to determine whether a Bed and Banks permit is required.

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

However, it is necessary to consider the proposed clearing in context:

- the watercourses have previously been disturbed by mineral exploration activity;

- the watercourses flow very rarely, with a very limited flow duration;

- vegetation downstream of the watercourses is likely to benefit from occasional flows, but is not likely to be dependent on them for survival; and

- the vegetation surrounding the watercourses is not riparian vegetation.

On this basis, it is unlikely that the proposed clearing will impact on any watercourses or wetlands of significant environmental value.

Methodology Bureau of Meteorology (2009)

Luke et al. (1987)
GIS Database
- Hydrography - Linear

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

Comments

Proposal is not likely to be at variance to this Principle

Pioneer Nickel Ltd (2008) describes the soils of the application area as generally sandy loamy soils and clays overlying granite and felsic volcanic rocks in the south-western section of the application area. The hilly sections are described as being generally shallow and more skeletal comprising abundant rock fragments on the steeper sections of the scree slopes overlying siltstones and laterite outcrops (Pioneer Nickel Ltd, 2008).

According to available GIS datasets, there is one soil type (MM15) within the application area (GIS Database). This soil type is described as:

(i) on rolling to undulating terrain, brown and grey cracking clays;
(ii) on rolling areas, similar shallow soils, with a complex association of soils often containing some ironstone gravels (Bureau of Rural Sciences, 1992).

The Department of Agriculture and Food Western Australia (DAFWA, 2006) describes the landscape and soils of the 'Ravensthorpe Zone' as rolling low hills on greenstone (mafic and ultramafic) and soils as alkaline sandy duplex soils with some clays, sands and gravels.

Sandy earths have a moderate to high risk of wind erodibility and seasonal water logging may occur over the sandy topsoil and clays (Schoknecht, 2002), whilst the Ravensthorpe area is described as having a moderate to high salinity risk (DAFWA, 2006). However, the linear nature of the clearing suggests that the potential for wind erosion is low, and provided the disturbed areas are rehabilitated after drilling is completed there would be minimal risk of increased salinity and/or water logging.

There is no known occurrence of *Phytophthora cinnamomi* (dieback) within the application area (Pioneer Nickel Ltd, 2008). The Ravensthorpe area is recognised as being at risk to the introduction of dieback. The proposed exploration activities should be undertaken during dry soil conditions to minimise the introduction of the plant pathogen (DEC, 2006).

Based on the above, the proposed clearing is not likely to be at variance to this Principle. It is recommended that should a permit be granted, a condition be imposed on the permit with regard to hygiene to minimise the risk of the introduction and/or spread of dieback and weeds. In addition, a condition be imposed on the permit with regard to the stockpiling of all cleared topsoil and vegetation for rehabilitation purposes.

Methodology

Bureau of Rural Sciences (1992)
DAFWA (2006)
DEC (2006)
Pioneer Nickel Ltd (2008)
Schoknecht (2002)
GIS Database
- Soils - Statewide

(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 may be at variance to this Principle

The application area is located within the Elverdton-Desmond area. The Elverdton-Desmond area and surrounding areas are one of the three areas of highest flora endemism in Western Australia, with more than 60 endemic species with a range of less than 30 kilometres (Craig, 2008). The application area forms part of the Ravensthorpe Range Area, recognised as an Environmentally Sensitive Area (ESA), and has been listed by the Australian Heritage Council on the Register of National Estate (GIS Database; DEWHA, 2009).

The Ravensthorpe Range Area is rich in floral species and contains many rare and endemic plant species, including many species that are not known from the surrounding country. Some of these species are endemic, with some being common to the area but rare elsewhere (EPA, 1974). The Ravensthorpe Ranges are also a focal point for species of *Eucalyptus*, with over 20 taxa occurring in the area and it is the only natural locality of several *Eucalypts* (DEWHA, 2009).

The application area lies within the eastern section Fitzgerald Biosphere which is a part-tenured management concept recognised by United Nations Educational, Scientific and Cultural Organisation (UNESCO) as well as by State and Commonwealth Governments (Craig et al., 2007). The concept includes a core area (Fitzgerald River National Park), buffer zone (Crown land and unvested reserves) and a zone of co-operation (private freehold farmland: cleared and uncleared) (Craig et al., 2007).

The Ravensthorpe Range vegetation is recognised as an important linkage between the Fitzgerald River National Park and crown land east of the vermin proof fence, allowing for the continuity of biological processes (Craig et al., 2007). The long term sustainability and viability of this corridor will largely depend on maintaining the vegetation in excellent condition. Secondary impacts such as spread of dieback, weeds, erosion and drainage effects can impact an area far in excess of the immediate project area. However, given the small area proposed to be cleared and prior disturbances that have taken place, it is unlikely that the proposed clearing will significantly impede the use of this corridor by fauna.

Based on the above, the proposed clearing may be at variance to this Principle. However, the small area proposed to be cleared is unlikely to significantly impact on the environmental values of the surrounding areas. It is recommended that should a permit be granted, a condition be imposed on the permit with regard to dieback and weed management. In addition, a condition should be imposed on the permit with regard to the stockpiling of all cleared topsoil and vegetation for rehabilitation purposes.

Methodology
Craig (2008)
Craig et al. (2007)
DEWHA (2009)
EPA (1974)
GIS Database
- Environmentally Sensitive Areas

(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

According to available GIS datasets, the application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database).

There are no permanent water bodies or watercourses within the application area (GIS Database). The application area is located in a temperate Mediterranean region and experiences an average annual rainfall of approximately 426.6 millimetres (CALM, 2002; Bureau of Meteorology, 2009).

The application area is located within the Yilgarn South West Groundwater Province (GIS Database). The groundwater salinity within the application area is approximately 7,000 - 14,000 milligrams/Litre Total Dissolved Solids (TDS) (GIS Database). Given the size of the area to be cleared (2.57 hectares) compared to the size of the Yilgarn South West Groundwater Province (24,601,260 hectares) (GIS Database), the proposed clearing is not likely to cause salinity levels within the application area to alter significantly.

There are no known groundwater dependent ecosystems within the application area (GIS Database).

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

Methodology
Bureau of Meteorology (2009)
CALM (2002)
GIS Database
- Groundwater - Provinces
- Groundwater Salinity
- Hydrography - Linear
- Potential Groundwater Dependent Ecosystems
- Public Drinking Water Source Area

(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 application area is located on the Jerdacuttup River Catchment area, with the Cordingup Creek to the north and Jerdacuttup River to the north and east (GIS Database). The low rises of shallow soils are intersected by weak drainage lines that eventually drain into Cordingup Creek and the Jerdacuttup River (Pioneer Nickel Ltd, 2006). The topography of the application area is gently undulating, suggesting that the area is not likely to be subject to flooding (GIS Database).

The small area to be cleared (2.57 hectares) in relation to the size of the Jerdacuttup River Catchment area (173,928 hectares) is not likely to lead to an increase in flood height or duration (GIS Database).

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

Methodology
Pioneer Nickel Ltd (2006)
GIS Database
- Hydrographic Catchments - Catchments

- Hydrography - Linear
- Topographic Contours - Statewide

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

Comments

There are two native title claims (WC98_070 and WC96_109) over the area under application. These claims have been registered with the National Native Title Tribunal on behalf of the claimant group. However, the tenement has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are no registered Aboriginal Sites of Significance located within the application area (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Sites of Aboriginal Significance are damaged through the clearing process.

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

The applicant has been granted four other clearing permits in the vicinity. One of these was referred to the Environmental Protection Authority, and subsequently it was determined that the proposal could be managed under the provisions of Part V of the *Environmental Protection Act 1986*.

Under section 51E of the *Environmental Protection Act 1986* it is a requirement to invite any public authority or person to comment on the clearing proposal within such a period as the CEO specifies. The Department of Mines and Petroleum sent a direct interest letter on 27 January 2009. The submissions period relating to the direct interest letter closed on 17 February 2009. A direct interest submission was received on 5 March 2009. The Assessing Officer notes that the submission was received outside of the period as specified by the CEO.

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

4. Assessor's comments

Comment

The proposal has been assessed against the Clearing Principles, and the proposal is not at variance to Principle (e), is not likely to be at variance to Principles (b), (g), (i) and (j), may be at variance to Principles (a), (c), (d) and (h) and is at variance to Principle (f).

It is recommended that should a permit be granted, conditions be imposed on the permit with regard to flora management, dieback and weed management, rehabilitation, record keeping and permit reporting.

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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
DMP	Department of Mines and Petroleum
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.