Government of Western Australia
Department of Mines and Petroleum

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 4835/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Tiwest Pty Ltd

1.3. Property details

Property: Exploration Licence 70/2345
Exploration Licence 70/2346
Local Government Area: Shire of Dandaragan
Colloquial name: Cooljarloo Project

1.4. Application

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

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 5 April 2012

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description

Beard vegetation associations have been mapped for the whole of Western Australia. Two Beard vegetation associations have been mapped within the application area:

1029: Shrublands; scrub-heath dryandra-calothamnus association with *Banksia prionotes* on limestone in the northern Swan Region; and
1030: Low woodland; *Banksia attenuata* & *B. menziesii* (GIS Database).

Woodman Environmental Consulting Pty Ltd carried out structural plant community mapping of the Cooljarloo West area in November 2008. Mapping was undertaken using aerial photography, various Department of Environment and Conservation databases and data collected from numerous flora and vegetation surveys undertaken in the Cooljarloo West area between 2005 and 2008 (Woodman Environmental Consulting Pty Ltd, 2009a).

A total of 22 structural plant communities were described and mapped within the Cooljarloo West area, seven of which occur in the area subject to this clearing permit application (Woodman Environmental Consulting Pty Ltd, 2009a; Tiwest Pty Ltd, 2012a):

Heaths

H4 - Heath dominated by a mix of species including *Banksia telmatiaea*, *Regelia ciliata* and *Melaleuca seriata* with occasional Scrub or Open Scrub of *Hakea obliqua* subsp. *parviflora* on grey or brown sand on lowerslopes, flats and drainage basins;

H5 - Heath dominated by *Allocasuarina humilis* and *Melaleuca seriata* with emergent *Eucalyptus todtiana* and *Nuytsia floribunda* on brown sand on midslopes;

H7 - Low Heath dominated by *Gastrolobium oxylobioides* and *Hakea* spp. on brown sand over laterite on midslopes and low rises;

Woodlands

W1 - Low Woodland to Dense Low Forest of *Melaleuca rhaphiophylla* over Low Sedges on brown sand over clay in basins;

W2 - Low Woodland to Low Forest of *Eucalyptus rudis* or *Corymbia calophylla* and *Melaleuca* spp. over Low Scrub or Scrub on grey or brown sand or clay on lowerslopes, drainage lines and basins;

W3 - Low Woodland to Low Forest of *Banksia attenuata* and *Banksia menziesii* with occasional *Eucalyptus todtiana* over Heath dominated by *Eremaea pauciflora* and/or *Hibbertia hypericoides* on brown or grey sand on

lower to midslopes;

W4 - Open Low Woodland of *Banksia attenuata*, *Banksia menziesii* and *Melaleuca preissiana* over Low Heath on brown sand in swales and low rises.

In addition, Woodman Environmental Consulting Pty Ltd has undertaken Floristic Community Type (FCT) mapping in the Falcon area, which is north-east of this clearing permit application. Woodman Environmental Consulting Pty Ltd have attempted to align the plant communities recorded within the Cooljarloo West project area with previous studies conducted in the Falcon project area. A total of 11 FCTs were mapped for the Falcon area and of these six correlate with plant communities in the proposed clearing area:

FCT1 - Heath dominated by *Banksia telmatiaea* and/or *Melaleuca viminea* subsp. *viminea* on grey or brown sandy clay in drainage lines and basins;

FCT 2 - Heath dominated by a mix of species including *Melaleuca brevifolia*, *M. rhaphiophylla* and *M. lateriflora* subsp. *acutifolia* interspersed with stands of *Viminaria juncea* on grey or brown sandy clay on lowerslopes, flats and basins;

FCT 4 - Scrub of *Viminaria juncea* over Heath of *Banksia telmatiaea* and *Regelia ciliata* on grey or brown sand in wet basins;

FCT 5 - Species rich Heath dominated by *Banksia telmatiaea* and various other species including *Beaufortia squarrosa*, *Kingia australis* and *Regelia ciliata* on brown or grey sand on lowerslopes, flats and depressions;

FCT 9a - Low Woodland of *Banksia attenuata*, *B. menziesii* and *Eucalyptus todtiana* with occasional *Banksia ilicifolia* over Heath on grey or white sand on mid to upperslopes; and

FCT 11 - Low Heath dominated by *Calothamnus sanguineus*, *Hakea incrassata*, *H. lissocarpha* and *Hibbertia* spp. on grey or brown sandy clay with lateritic gravel on midslopes and swales (Woodman Environmental Consulting Pty Ltd, 2009a).

Clearing Description

Tiwest Pty Ltd has applied to clear up to 32.7 hectares of native vegetation for the purpose of mineral exploration. Tiwest Pty Ltd proposes to undertake exploration drilling for mineral sands within tenements immediately west of the existing Cooljarloo Mine. The application area consists of approximately 125.8 kilometres of drill lines and access tracks with line spacing at approximately 125 metres.

Native vegetation clearing will consist of driving over vegetation wherever possible. In areas where vegetation is too dense to employ this clearing technique a rubber tyred front end loader will flatten vegetation using a raised blade.

Vegetation Condition

Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994);
To:
Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery, 1994).

Comment

The vegetation condition is based on information provided by Mattiske Consulting (2012).

3. Assessment of application against clearing principles

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

Comments

Proposal is at variance to this Principle

The proposed clearing area is located approximately south-east of Cervantes in the Swan Coastal Plain 2 subregion of the Swan Coastal Plain Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (GIS Database). The Swan Coastal Plain 2 subregion is characterised by Banksia and Tuart on sandy soils, *Casuarina obesa* on outwash plains and paperbark in swampy areas. The subregion is a part of the South West Botanical Province, an area which has a very high degree of species diversity. The subregion is comprised of a complex series of seasonal wetlands, with more than 25% of the Swan Coastal Plain land area between Wedge Island and Dunsborough being wetland (CALM, 2002).

The Cooljarloo West area contains very high floristic diversity, with Woodman Environmental Consulting Pty Ltd recording 617 flora taxa (including 4 Threatened Flora taxa and 39 Priority Flora taxa) at Cooljarloo West between 2005 and 2008 (Woodman Environmental Consulting Pty Ltd, 2009a). A total of 22 plant communities were identified in the Cooljarloo West area through structural plant community mapping, seven of which will be impacted to some degree by the proposed clearing (Tiwest Pty Ltd, 2012a). A number of the communities recorded during the surveys have been identified as being restricted communities (Tiwest Pty Ltd, 2012a). Efforts have been made to avoid these communities, however, the restricted community W4 occurs within the application area (Tiwest Pty Ltd, 2012a). Two proposed drill lines pass through plant community W4, which is significant as it is likely to be associated with an underground mound spring. Clearing of this community will be approximately 0.21 hectares, less than 0.9% of the total extent of W4, so the clearing is not expected to cause significant impacts to the restricted communities (Woodman Environmental Consulting Pty Ltd, 2009a; Tiwest Pty Ltd, 2012a). The proposed drilling within plant community W4 will also provide an opportunity to log the soil structure and depth of water to determine the structure supporting the community (Tiwest Pty Ltd, 2012a).

There have been 39 species of Priority Flora recorded in the Cooljarloo West area (Woodman Environmental Consulting Pty Ltd, 2009a). Whilst a large number of Priority Flora taxa are known from Cooljarloo West, Woodman Environmental Consulting Pty Ltd (2009a) notes that the proposed clearing is likely to cause minimal impact to the local and regional distribution to the majority of these taxa given the large ranges, extensive habitats and populations located within secure tenure. The linear nature of the proposed clearing and the minimal disturbance to topsoil was also taken into consideration when assessing potential impacts of this clearing proposal.

On this basis, Tiwest Pty Ltd has adopted a risk-based approach to the management of Priority Flora during mineral exploration activities, commissioning flora surveys to focus only on the poorly known Priority Flora taxa with restricted distributions during the significant flora assessment. During a flora survey of the application area between September to November 2011, Mattiske Consulting (2012) recorded ten species of Priority Flora within the 10 metre survey corridor. None of these species were identified by Woodman Environmental Consulting Pty Ltd as species requiring avoidance or additional survey (Tiwest Pty Ltd, 2012a). Individuals and locations of some Priority Flora species will be avoided by following the flagging, however, some of the species are in large numbers, such as *Melaleuca clavifolia* (Priority 3), and could not be detoured around (Tiwest Pty Ltd, 2012a).

Tiwest Pty Ltd have adopted a strategy to minimise the impact on Threatened Flora, Priority Flora and significant vegetation communities that is described in their Exploration Environmental Management Plan and based on recommendations by Woodman Environmental Consulting Pty Ltd (2009a) following extensive vegetation mapping of the Cooljarloo West and Falcon areas (Tiwest Pty Ltd, 2012a). Consultation with the Department of Environment and Conservation (DEC) and the Department of Mines and Petroleum (DMP) has occurred during the development of the exploration program. Tiwest Pty Ltd's Exploration Environmental Management Plan has previously been endorsed by DEC (DEC, 2011) and during a recent site visit by the assessing officer and DEC officers it was expressed that the approach used by Tiwest Pty Ltd adequately minimised impacts associated with exploration drilling. Planning procedures designed to reduce the impact on floristic biodiversity include:

- Preferentially locate accessways and drill lines on existing cleared tracks and firebreaks;
- For works programs that involve clearing native vegetation, a flora and vegetation risk assessment must be completed. The desktop risk assessment will determine if field survey is required based on structural community mapping and the association with conservation significant values. Given the Threatened and Priority Flora present in the area, field survey will be required for most programs;
- Proposed drill lines identified as needing survey are surveyed to a width of 10 metres by an experienced botanist at an appropriate time of the year;
- If conservation significant flora or vegetation are encountered with the survey corridor, the position is flagged, the location recorded with a GPS and alternative routes or other management measures proposed;
- Where Threatened Flora or Threatened Ecological Communities are recorded, the surrounding area will be searched to estimate and record the population size and deviate the track to a minimum of 50 metres away from the plants;
- Other features of environmental significance are identified, recorded and avoided where possible including large trees, slow growing species and wetlands (Tiwest Pty Ltd, 2012b).

During the exploration works, the following procedures are used to reduce the impact on floristic biodiversity:

- When the clearing is conducted, locations of Threatened Flora will be recognised by flagging and/or GPS data and drill holes will be located away from the sites. Individual plants will be avoided where practical;
- All vehicle movements will be restricted to defined tracks and survey lines;
- All vehicles will engage four wheel drive mode to minimise the potential for wheel rutting;
- All vehicles used during the proposed clearing and exploration drilling are relatively light, thereby reducing the potential for soil compaction (Tiwest Pty Ltd, 2012a, 2012b).

Dieback surveys have been conducted over the Cooljarloo area and no occurrences of *Phytophthora cinnamomi* were recorded (Tiwest Pty Ltd, 2012a). Tiwest Pty Ltd and Woodman Environmental Consulting Pty Ltd (2009b) developed a *Phytophthora* and weed hygiene risk assessment, a hygiene map and wash down procedures to reduce the potential for impact on flora and vegetation (Tiwest Pty Ltd, 2012a).

From a faunal perspective, 253 vertebrate fauna species (including 36 species of conservation significance) may occur in the Cooljarloo West area (Tiwest Pty Ltd, 2011). Field surveys of the Cooljarloo area have recorded three amphibians, ten reptiles, 21 birds and nine mammal species (Tiwest Pty Ltd, 2011). More than 20,000 hectares of uncleared native vegetation is present on Exploration Licences 70/2345 and 70/2346, and numerous conservation estates are located in close proximity to the proposed clearing area (GIS Database). It is considered unlikely that the linear areas applied to clear would support a higher level of faunal diversity than surrounding uncleared areas of native vegetation.

Given the high level of floristic diversity in the Cooljarloo West area (including an abundance of conservation significant flora), the proposed clearing is at variance to this Principle.

Methodology

CALM (2002)
DEC (2011)
Mattiske Consulting (2012)
Tiwest Pty Ltd (2011)
Tiwest Pty Ltd (2012a)
Tiwest Pty Ltd (2012b)
Woodman Environmental Consulting Pty Ltd (2009a)
Woodman Environmental Consulting Pty LTd (2009b)
GIS Database:
- DEC Tenure
- IBRA WA (Regions - Subregions)

(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 may be at variance to this Principle

Fauna studies have been undertaken at the Cooljarloo mine site area since 1986, with a majority of work conducted by Bamford Consulting Ecologists. Terrestrial vertebrates and aquatic macro-invertebrates have been sampled using a variety of techniques such as bird censussing, mist netting, pitfall, funnel, Elliot and cage trapping (Tiwest Pty Ltd, 2012a). Baseline surveys have confirmed that significant species are present on the Cooljarloo tenements (Tiwest Pty Ltd, 2012a). It is inferred that the fauna assemblages of the Cooljarloo tenements would be the same as that of the Cooljarloo west tenements subject to this clearing permit application.

Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) (Schedule 1; Endangered) are known within the Cooljarloo West area (Tiwest Pty Ltd, 2012a). Parts of the application area are suitable feeding habitat for this species (Tiwest Pty Ltd, 2012a). Whilst some feeding habitat will be impacted by the proposed clearing, it is a relatively small amount of the available feeding habitat in the local area. Large trees have been flagged to be avoided to further reduce the potential impacts on Carnaby's Black Cockatoos (Tiwest Pty Ltd, 2012a).

The Cooljarloo West Exploration Drilling Programme will involve low impact, non-contiguous clearing of 32.7 hectares of native vegetation. Localised impacts to fauna species would be expected to be of a minor nature and may include:

- Change in hydrology of the area;
- Direct mortality of fauna during vegetation clearing or vehicle strike;
- Temporary loss of habitat for foraging, shelter and/or nesting;
- Localised displacement;
- Increased competition for resources in adjacent habitat;
- Increased access for feral animals along cleared drill lines and access tracks; and
- Noise pollution.

Vehicles travelling along drill lines will be slow moving, thereby reducing the potential for animal deaths. Vehicles travelling on existing access tracks will be moving slightly faster, however the risk of fauna mortality from vehicle strike is still considered low (Tiwest Pty Ltd, 2011). In accordance with the Exploration Environmental Management Plan, low impact vegetation flattening techniques will be employed and large trees and thick vegetation will be avoided wherever possible (Tiwest Pty Ltd, 2012b). Impacts of the proposal on fauna habitat are therefore unlikely to be significant.

Flattening of vegetation in corridors which will be 2.6 metres wide (with the exception of drilling locations and the end of drill lines which will be approximately 4 metres in width) is unlikely to result in a loss of significant habitat for any fauna species indigenous to Western Australia.

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

Methodology

Tiwest Pty Ltd (2011)
Tiwest Pty Ltd (2012a)
Tiwest Pty Ltd (2012b)

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

Comments

Proposal is at variance to this Principle

Numerous flora surveys have been undertaken over the Cooljarloo West area and three Threatened Flora species have been recorded during the surveys in the Cooljarloo West exploration area. These species are *Andersonia gracilis*, *Macarthuria keigheryi* and *Anigozanthos virdis* subsp. *tetraspectans* (Tiwest Pty Ltd, 2012a).

Tiwest Pty Ltd have adopted a strategy to minimise the impact on Threatened Flora that is described in their Exploration Environmental Management Plan and based on recommendations by Woodman Environmental Consulting Pty Ltd (2009a) following extensive vegetation mapping of the Cooljarloo West and Falcon areas

(Tiwest Pty Ltd, 2012a). Between September to November 2011, Mattiske Consulting (2012) undertook field surveys along the proposed 2012/2013 drill lines in alignment with Woodman Environmental Consulting Pty Ltd (2009a) risk assessment methodology. All proposed access tracks and drill lines were surveyed with a 10 metre wide corridor. All species or communities of conservation significance noted within the 10 metre corridor were identified and recorded. Where the species or communities of conservation significance were noted, a wider corridor was searched to determine if a deviation with lesser impact could be proposed. Some searching outside the 10 metre corridor was also undertaken for those species recorded within the corridor to provide local population contextual information. Where a deviation would lessen the impact on any Threatened Flora or specific Priority Flora species, it was flagged and GPS points recorded.

The majority of deviations flagged by Mattiske Consulting (2012) have been adopted and the appropriate alterations made to the proposed clearing area for the 2012/2013 drilling program (Tiwest Pty Ltd, 2012a). While an effort was made to avoid Threatened Flora, some individual plants are still located within the 10 metre drill line corridor i.e. the clearing permit boundary and others are located within 50 metres of drill lines. Ninety-two *Andersonia gracilis* plants are located within the 10 metre drill line corridor. While there is the potential for all these plants to be cleared, the actual clearing path will be approximately 2.6 metres wide, less than the surveyed corridor, so the likelihood of impacting the plants will be lower (Tiwest Pty Ltd, 2012a). Approximately 1,990 *Andersonia gracilis* and six *Macarthuria keigheryi* plants are located within 50 metres of drill lines. Vegetation within 50 metres of Threatened Flora is considered significant habitat for the plants. A permit to take Threatened Flora has been applied for with the Department of Environment and Conservation (DEC) for the Cooljarloo West exploration program.

Additional management controls to reduce the impact on Threatened Flora and their habitat include:

- When the clearing is conducted, locations of Threatened Flora will be recognised by flagging and/or GPS data and drill holes will be located away from the sites. Individual plants will be avoided where practical;
- All vehicle movements will be restricted to defined tracks and survey lines;
- All vehicles will engage four wheel drive mode to minimise the potential for wheel rutting; and
- All vehicles used during the proposed clearing and exploration drilling are relatively light, thereby reducing the potential for soil compaction (Tiwest Pty Ltd, 2012a, 2012b).

Consultation with DEC and DMP has occurred during the development of the exploration program. Tiwest Pty Ltd's Exploration Environmental Management Plan has previously been endorsed by DEC (DEC, 2011) and during a recent site visit by the assessing officer and DEC officers it was expressed that the approach used by Tiwest Pty Ltd adequately minimised impacts associated with exploration drilling.

Based on the above, the proposed clearing is at variance to this Principle. The clearing has the potential to impact the habitat of *Andersonia gracilis* and *Macarthuria keigheryi* plants. However, the proposed clearing has been designed to minimise disturbance to Threatened Flora and its habitat. The taking of the actual plants is assessed by Species and Communities Branch of DEC, with the final decision made by the Minister for Environment.

Methodology
DEC (2011)
Mattiske Consulting (2012)
Tiwest Pty Ltd (2012a)
Tiwest Pty Ltd (2012b)
Woodman Environmental Consulting Pty Ltd (2009a)

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

Comments
Proposal is not likely to be at variance to this Principle
According to available databases, there are no known Threatened Ecological Communities (TECs) within the application area (GIS Database). None of the structural plant communities or floristic community types within the application area or that occur in the Cooljarloo West area have been identified as being a TEC (Woodman Environmental Consulting Pty Ltd, 2009a; Mattiske Consulting, 2012).

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

Methodology
Mattiske Consulting (2012)
Woodman Environmental Consulting Pty Ltd (2009a)
GIS Database:
- Threatened Ecological Sites Buffered

(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 area applied to clear is within the Swan Coastal Plain Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (GIS Database). According to Shepherd (2009) there is approximately 39.2% of the pre-

European vegetation remaining in the Swan Coastal Plain bioregion. At the subregional level, there is approximately 42.4% of the pre-European vegetation remaining in the Perth subregion.

The vegetation of the proposed clearing area has been mapped as (GIS Database):

Beard vegetation association 1029: Shrublands; scrub-heath dryandra-calothamnus association with *Banksia prionotes* on limestone in the northern Swan Region; and
Beard vegetation association 1030: Low woodland; *Banksia attenuata* & *B. menziesii*.

There is approximately 71.4% and 70.8% of the pre-European vegetation remaining of Beard vegetation associations 1029 and 1030, respectively, in the Perth Swan Coastal Plain subregion (see table) (Shepherd, 2009). The area proposed to clear does not represent a significant remnant of vegetation in the wider regional area. The proposed clearing will not reduce the extent of Beard vegetation associations 1029 and 1030 below current recognised threshold levels, below which species loss increases significantly.

	Pre-European Area (ha)*	Current Extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves (and current %)
IBRA Bioregion – Swan Coastal Plain	1,501,209	587,889	~39.2	Depleted	10.5 (24.6)
IBRA Subregion – Perth	1,117,744	474,119	~42.4	Depleted	11.6 (24.7)
Shire of Dandaragan	670,531	295,860	~44.1	Depleted	17.8 (39.1)
Beard Veg Assoc. – State					
1029	71,036	50,934	~71.7	Least Concern	26.2 (36.5)
1030	139,013	90,112	~64.8	Least Concern	9.8 (15.1)
Beard Veg Assoc. - Bioregion					
1029	68,329	48,792	~71.4	Least Concern	25.1 (35.1)
1030	134,789	87,137	~64.6	Least Concern	8.5 (13.1)
Beard Veg Assoc. – Subregion					
1029	68,329	48,792	~71.4	Least Concern	25.1 (35.1)
1030	114,216	80,920	~70.8	Least Concern	9.8 (13.8)

* Shepherd (2009)
** Department of Natural Resources and Environment (2002)

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

Methodology Department of Natural Resources and Environment (2002)
Shepherd (2009)
GIS Database:
- IBRA WA (Regions - Sub Regions)
- Pre-European Vegetation

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

Comments

Proposal is at variance to this Principle

The proposed clearing area includes a number of small swamps, damplands, sumplands, palusplain and areas subject to inundation (Tiwest Pty Ltd, 2012a; GIS Database).

Seminiuk (1994) (cited in Woodman Environmental Consulting Pty Ltd, 2006) undertook an ecological assessment and evaluation of System 5 wetlands, including the proposed clearing area and surrounds. The proposed clearing area is a part of the Mullering Wetlands chain, forming part of the Minyulo Suite; consisting of microscale sumplands, damplands and creeks. Water ranges from fresh to hypersaline and is maintained in wetlands through ponding and groundwater rise (Seminiuk, 1994; cited in Woodman Environmental Consulting Pty Ltd, 2006). Vegetation throughout forms complete cover or is a mosaic with open water. The Minyulo Suite consists of diverse habitats, serving a number of important ecological functions such as the provision of habitat for conservation significant flora, sediment transportation, acting as a pathway and habitat for fauna and acting with a flushing mechanism to basin wetlands, floodplains/plausplains (Seminiuk, 1994; cited in Woodman Environmental Consulting Pty Ltd, 2006).

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

Impacts to native vegetation growing in association with watercourses and wetlands will be minimised as far as practicable by avoiding drainage areas wherever possible, employing low impact clearing techniques and adhering to weed and dieback protocols as outlined in the Exploration Environmental Management Plan and weed and dieback risk assessment (Woodman Environmental Consulting Pty Ltd, 2009b; Tiwest Pty Ltd, 2012a).

Methodology

Tiwest Pty Ltd (2012a)
Woodman Environmental Consulting Pty Ltd (2006)
Woodman Environmental Consulting Pty Ltd (2009b)
GIS Database:
- Geomorphic Wetlands Cervantes Eneabba
- Geomorphic Wetlands Cervantes South
- Hydrography, Linear

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

Comments

Proposal is not likely to be at variance to this Principle

The proposed clearing area is located on the Swan Coastal Plain and occurs within the Bassendean Land System. This land system is characterised by a series of low vegetated dunes with interdunal seasonal wetlands and swamps. Soils are typically yellow to grey quartz sands (Tiwest Pty Ltd, 2012a).

Tiwest Pty Ltd (2012a) will implement low impact vegetation clearing techniques to minimise the potential for land degradation. For example, vegetation will be driven over or flattened using a rubber tyred front end loader using a raised bucket, as opposed to blade-down clearing. This technique will leave vegetation in situ, thereby preserving rootstock and minimising disturbance to topsoil. Wheel rutting and the creation of preferential flow paths for surface water run-off will also be reduced, minimising the potential for soil erosion. Other management strategies to be implemented during the proposed vegetation clearing include (Tiwest Pty Ltd, 2012a, 2012b):

- All vehicle movements will be restricted to defined tracks and survey lines;
- All vehicles will engage four wheel drive mode to minimise the potential for wheel rutting;
- All vehicles used during the proposed clearing and exploration drilling are relatively light, thereby reducing the potential for soil compaction;
- Drilling is conducted using an aircore rig which does not involve the use of any drilling fluids, muds or other materials with potential for land contamination; and
- Large trees and thick vegetation will be avoided where possible.

Provided that the management strategies as outlined above are implemented, the proposed clearing is unlikely to cause appreciable land degradation.

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

Methodology

Tiwest Pty Ltd (2012a)
Tiwest Pty Ltd (2012b)

(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

None of the proposed clearing is within Western Australia's conservation estate, however it is located in close proximity to a number of conservation reserves, namely (GIS Database):

- An un-named 'A Class' Nature Reserve, Reserve 40916 (located approximately 45 metres from the nearest proposed drill line);
- The 'C Class' Southern Beekeepers Nature Reserve (located approximately 3 kilometres west from the nearest proposed drill line);
- The 'C Class' Wongonderrah Nature Reserve (located approximately 10 kilometres north-west of the nearest proposed drill line);
- The 'C Class' Wanagarren Nature Reserve (located approximately 8.5 kilometres southwest of the nearest proposed drill line);
- Nambung National Park (located approximately 360 metres west of the nearest proposed drill line);
- An un-named Conservation Park, Reserve 41986 (located approximately 4.6 kilometres northeast of the nearest proposed drill line); and
- Badgingarra National Park (located approximately 12 kilometres northeast of the nearest proposed drill line).

The proposed vegetation clearing has the potential to impact on the environmental values of adjacent and

nearby conservation areas through weed and dieback invasion, especially at a distance of 45 metres from the nearest Nature Reserve. Other conservation reserves located several kilometres from the proposed clearing are far less likely to be impacted.

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

Woodman Environmental Consulting Pty Ltd (2009b) undertook a weed and dieback risk assessment on behalf of Tiwest Pty Ltd to produce a hygiene risk map for the Cooljarloo West area, to identify high-risk activities associated with the proposed clearing and exploration and to propose a number of strategies to manage the risks. Provided that the risk assessment recommendations are strictly adhered to, the risk of spreading weeds and dieback into adjacent and nearby conservation areas is considered manageable. Impacts from weeds and dieback may be minimised by the implementation of weed and dieback conditions.

Methodology Woodman Environmental Consulting Pty Ltd (2009b)
GIS Database:
- DEC Tenure
- Register of National Estate

(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 includes swamps, damplands, sumplands, palusplains and areas subject to innundation (Tiwest Pty Ltd, 2012a; GIS Database). There is a limited potential for surface water quality to be impacted by vegetation clearing given the low impact clearing techniques which will be employed. Vegetation will be flattened by a raised bucket of a rubber tyred front end loader. Rootstock and topsoil will remain intact (Tiwest Pty Ltd, 2012a). Surface water run-off from cleared areas is therefore unlikely to result in sedimentation or turbidity of surface water features on site or off site.

The proposed clearing area is not located within a Public Drinking Water Source Area (GIS Database). The groundwater of the local area consists of a superficial aquifer (3 - 15 metres below surface, to a depth typically less than 50 metres) which is charged by winter rains (Tiwest Pty Ltd, 2012b). Low impact clearing techniques will be employed which include driving over vegetation and flattening vegetation with a raised bucket of a front end loader (Tiwest Pty Ltd, 2012a). No significant impacts to groundwater are expected as a result of clearing (Tiwest Pty Ltd, 2012b).

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

Methodology Tiwest Pty Ltd (2012a)
Tiwest Pty Ltd (2012b)
GIS Database:
- Hydrography, Linear
- Public Drinking Water Source Areas (PDWSAs)

(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 Cooljarloo West exploration area, including the application area, contains seasonally wet depressions and creeklines which form part of the Mullering Wetlands chain (Woodman Environmental Consulting Pty Ltd, 2006). The proposed clearing area is located in the Nambung River catchment, an area of approximately 295,652 hectares (GIS Database). The scale and nature of the proposed clearing render the proposal unlikely to exacerbate the incidence or intensity of natural flood events.

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

Methodology Woodman Environmental Consulting Pty Ltd (2006)
GIS Database:
- Hydrographic Catchments - Catchments

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

Comments

There is one Native Title Claim (WC97/71) over the area under application (GIS Database). This claim has been registered with the National Native Title Tribunal on behalf of the claimant group. However, the mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

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

It is the proponent's responsibility to liaise with the Department of Environment 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 clearing permit application was advertised on 30 January 2012 by the Department of Mines and Petroleum inviting submissions from the public. No submissions were received.

Methodology GIS Database:
- Aboriginal Sites of Significance
- Native Title Claims - Registered with the NNTT

4. References

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5. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government
CALM	Department of Conservation and Land Management (now DEC), Western Australia
DAFWA	Department of Agriculture and Food, Western Australia
DEC	Department of Environment and Conservation, Western Australia
DEH	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
DEP	Department of Environment Protection (now DEC), Western Australia
DIA	Department of Indigenous Affairs
DLI	Department of Land Information, Western Australia
DMP	Department of Mines and Petroleum, Western Australia
DoE	Department of Environment (now DEC), Western Australia
DoIR	Department of Industry and Resources (now DMP), Western Australia
DOLA	Department of Land Administration, Western Australia
DoW	Department of Water
EP Act	Environmental Protection Act 1986, Western Australia
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World

	Conservation Union
RIWI Act	Rights in Water and Irrigation Act 1914, Western Australia
s.17	Section 17 of the Environment Protection Act 1986, Western Australia
TEC	Threatened Ecological Community

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.