



1. Application details

1.1. Permit application details

Permit application No.: 2368/1
 Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Tectonic Resources NL

1.3. Property details

Property: Mining Lease 74/53
 Local Government Area: Shire Of Ravensthorpe
 Colloquial name: Phillip River Gold Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
0.3		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
<p>Beard vegetation associations have been mapped at a 1:250,000 scale for the whole of Western Australia, and are a useful tool to examine the vegetation extent in a regional context. One Beard vegetation association was located within the application areas;</p> <p>47; Shrublands; tallerack mallee-heath.</p> <p>Biota Environmental Science conducted vegetation mapping of the application areas in April 2004 (Tectonic Resources NL, 2008). This survey identified two floristic community types which occur in the application areas;</p> <p>Ms (<i>Melaleuca stramentosa</i>) Mallee and dense heath (shrubs less than two metres); and</p> <p>BI (<i>Banksia lemmaniana</i>) Open mallee and thicket/scrub heath (dense to open shrubs 0.5-5 metres).</p>	<p>Tectonic Resources NL have applied to clear 0.3 hectares of native vegetation. Clearing will be undertaken in a series of segmented drill lines, with each line being accessed via existing tracks (Tectonic Resources NL, 2008). The application areas are located 15 kilometres south-east of the town site of Ravensthorpe within Mining lease 74/53 (GIS Database). Mining lease 74/53 is one of several leases which are often referred to as the Kundip Leases within this report. Clearing will be undertaken with a rubber wheeled loader with a bucket lip 20 centimetres above the ground (raised blade). The proposed clearing is for mineral exploration as an extension of the Phillips River Gold Project. Clearing will include 24 drill holes and drill pads, sumps and tracks. Drill pads will be 20 metres by 4 metres or smaller. Drilling will be undertaken with reverse circulation (RC) or rotary air blast (RAB) drilling rigs (Tectonic Resources NL, 2008).</p>	<p>Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery, 1994)</p> <p>To</p> <p>Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery, 1994)</p>	<p>Historic drill lines and mining disturbance occur within the application area (Tectonic Resources NL, 2008).</p>

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 application areas are situated approximately 15 kilometres to the south-east of the town site of Ravensthorpe, within the Fitzgerald subregion of the Esperance Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). Comer et al. (2001) characterises the Esperance bioregion as; myrtaceous and proteaceous scrub and mallee heaths on sand plain over lying Eocene sediments; rich in endemics. Vegetation types are diverse, often cryptic and significantly endemically localised in nature. Eucalypts dominate most systems in an unparalleled array of diversity. More cryptic vegetation communities comprise herbfields and heaths (rich in endemics) on abrupt granite tors and quartzite ranges that rise from the plain and the greenstone heath and shrublands.

On the continental stress class the Esperance bioregion is classed as 3 (where 1 is most stressed and 6 is least), however Comer et al. (2001) believes it should be 2, as approximately half of it has been cleared of native vegetation.

The proposal is within the 'zone of co-operation' within the Fitzgerald Biosphere, one of only two biospheres in Western Australia. Within this zone a variety of agricultural activities, human settlements and other uses may be undertaken for the community's benefit (Fitzgerald Biosphere Group, 2008). The Fitzgerald Biosphere has been recognised for its floral diversity internationally since 1978 as part of the United Nations Educational, Scientific and Cultural Organisation's (UNESCO) Man and the Biosphere Program (Environmental Protection Authority, 2006). More than 1,800 species of flowering plants, as well as many lichens, mosses and fungi, have been recorded in the Fitzgerald national park. This represents nearly 20 percent of the total number of plant species in Western Australia (Environmental Protection Authority, 2006).

The northern application areas cross an area of the Ravensthorpe Ranges recommended by the Environmental Protection Authorities Red Book to become a nature reserve (Ravensthorpe Ranges 3.8) (GIS Database). Based on this recommendation, a part of this area has been listed by the Australian Heritage Commission on the Register of National Estate due to its high level of botanical diversity (Department of Environment Water Heritage and the Arts, 2008). This proposed reserve (Ravensthorpe Ranges 3.8) is very different from the Fitzgerald River National Park and is a unique ecological niche in the state, containing a mix of species that are common in the wheat belt and the south-coast (Environmental Protection Authority, 2006).

The proposed clearing will occur within *Melaleuca stramentosa* (Ms) and *Banksia lemanniana* (Bl) vegetation units. *Banksia lemanniana* (Bl) vegetation unit is the most species rich community in the Kundip leases with 114 species, however it is also one of the most common (Craig, 2004a). Within this proposal, Tectonic Resources NL proposes to clear 0.12 percent of this vegetation unit where it occurs on the Kundip leases. *Melaleuca stramentosa* (Ms) vegetation unit is far less diverse with 26 species, however it is less common within the kundip leases (Craig, 2004a). Within this proposal Tectonic Resources NL propose to clear 0.21 percent of this vegetation unit where it occurs on the Kundip leases (Tectonic Resources NL, 2008).

A Declared Rare Flora (DRF) and Priority flora (P) search was conducted in October 2005 by Craig (2005) over the application areas. This survey revealed one species of DRF (*Morianthus mollis*) and six species of Priority (P) flora occurring within the application areas; *Melaleuca stramentosa* (P1), *Acacia disticha* (P2), *Acacia laricina var. crassifolia* (P2), *Acacia durabilis* (P3), *Boronia oxyantha var. brevicalyx* (P3) and *Siegfriedia darwinioides* (P4). Priority 1 flora, *Melaleuca stramentosa* is the dominant plant in the (Ms) floristic community type.

Biota Environmental Science conducted two fauna assessment of the Kundip Mining Leases which contains the application areas in January 2004 and November 2004 (Tectonic Resources NL, 2008). The field survey's and historic records revealed a total of 99 vertebrate species and 30 short range endemic invertebrate species with potential to occur within the application areas (Biota Environmental Science, 2008). Fourteen fauna species of conservation significance under the *Wildlife Conservation Act 1950* were identified to have potential to occur within the application areas (Biota Environmental Science, 2008). This appears to be a relatively large number of fauna species, however the survey area was very large, covering all of the Kundip Leases and flora habitat was very diverse (with 18 vegetation types recorded over the Leases). Within the application area, the Western Whipbird (*Psophodes nigrogularis oregon*) (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) and a skink, *Lerista viduata* (no common name) (Priority 1-taxa with few, poorly known populations on threatened land, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) were the only two species recorded which were of conservation significance (Biota Environmental Science, 2008).

Mining and transport activities have the potential to introduce dieback and weeds into the application areas (Environmental Protection Authority, 2006). Some vegetation communities within the application areas contain proteaceous species, which are particularly susceptible to dieback (Environmental Protection Authority, 2006). No weeds or dieback have been recorded in the application areas, however three weeds have been identified as possible threats as they occur in other areas on the Kundip leases; succulent (*Asteraceae sp*), bridal creeper (*Asparagus asparagoides*) and boxthorn (*Lycium ferocissimum*) (Craig, 2004a). The bridal creeper is now listed as a Weed of National Significance (Craig, 2004a). Considering that the proposal is within a proposed reserve and falls within the 'zone of co-operation' within the Fitzgerald Biosphere, weed and dieback should be managed.

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

A Dieback Management Plan and a Weed Management Plan exists for the Phillips River Gold Project, which encompasses the mining and development of the Kundip Ore reserve (Tectonic Resources NL, 2008). These management plans were developed in collusion with the Environmental Protection Authority (2006) to help prevent the spread of dieback and weeds into the Phillips River Gold Project areas. Provided the management plans are followed, the risk of dieback and weed infestation will be greatly reduced. The assessing officer recommends that should the permit be granted, conditions be imposed for the purpose of weed and dieback management.

Although the proposal is in an area of exceptionally high biodiversity, the application areas are relatively small. In total 0.3 hectares of native vegetation has been proposed to be cleared. Clearing is proposed to be undertaken in a series of small segmented patches of vegetation with a raised blade (Tectonic Resources NL, 2008). As roots will be left in tact and clearing will be undertaken in small patches, rehabilitation and regrowth is expected to be relatively successful.

The application areas have also been exposed to historic exploration. Existing tracks and drill lines will be used

in this proposal to access the application areas in order to reduce further clearing (Tectonic Resources NL, 2008).

Methodology Biota Environmental Science (2008)
Comer et al. (2001)
Craig (2005)
Craig (2004a)
Department of Environment Water Heritage and the Arts (2008)
Environmental Protection Authority (2006)
Fitzgerald Biosphere Group (2008)
Tectonic Resources NL (2008)
GIS Database:
- Interim Biogeographic Regionalisation of Australia
- Clearing Regulations- schedule one areas

(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

Biota Environmental Science conducted two fauna assessments of the Kundip Mining Leases in January 2004 and November 2004 (Tectonic Resources NL, 2008). The primary aims of these surveys were to;

- Collect information on the presence of vertebrate fauna and selected invertebrate taxa (short range endemics);
- Document the relative abundance of species;
- Document the components of the physical environment (ie. The fauna habitat); and
- Document existing levels of disturbance.

To achieve the above aims, Biota Environmental Science employed the following methods and techniques; pit fall trapping, Elliot trapping, cage trapping, avifauna censuses, and a range of non systematic fauna survey activities and opportunistic sightings (Biota Environmental Science, 2008). Biota Environmental Science also analysed historic records of conservation significant fauna, through a Department of Environment and Conservation database search.

The field survey and historic records revealed a total of 99 vertebrate species and 30 short range endemic invertebrate species with potential to occur within the application areas. Of the 99 Vertebrate species recorded there were, 62 species of bird (relatively high number), 11 species of native mammals, two species of introduced mammals, 21 species of reptiles and three species of frogs (Biota Environmental Science, 2008). The high number of birds recorded was due to the large areas which was surveyed, and comprehensive historic documentation. The area is frequented by bird watches and these records were used by Biota Environmental Science (2008) during there surveys. Specific invertebrate groups that were targeted with high potential to contain endemic species included; *Araneae* (spiders, in particular trapdoor and wolf spiders); *Pseudoscorpionida* (Pseudoscorpions); *Scorpionida* (Scorpions); *Diplopoda* (Millipedes); and *Pulmonata* (Land Snails) (Biota Environmental Science, 2008).

Species of conservation significance are of greatest concern due to their limited distribution, meaning native vegetation in some areas may be significant habitat for conservation. Of the 129 species of fauna which were found to occur or may occur in the vicinity of the Kindip Leases, 14 were of conservation (Biota Environmental Science, 2008). These species are discussed below.

The Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) is listed as Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*. This species has been recorded on three occasions as flocks of between two and seven birds flying in the vicinity of the application areas (Biota Environmental Science, 2008). It breeds in mature Eucalypt woodland such as Salmon Gum woodland which have suitable hollows for nesting (Department of the Environment, Heritage Water and the Arts, 2008), and feeds on plants such as Banksia, Dryandra, Hakea, Eucalyptus and Grevillea (Biota Environmental Science, 2008). Clearing of breeding habitat has been implicated in the decline of this species. The application areas are unlikely to be breeding locations due to the absence of aged Salmon Gum woodland (Biota Environmental Science, 2008). This species may utilise the area for feeding, however due to the relatively small size of the application areas (totalling 0.3 hectares), it is unlikely that the vegetation is significant habitat for this species.

The Malleefowl (*Leipoa ocellata*) is listed as Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008* (Biota Environmental Science, 2008). Craig and Bennet recorded a single individual on the 5/1/2004 in the vicinity of the application areas, which is the only official record near the application areas (Biota Environmental Science, 2008). During the recent survey conducted by Biota Environmental Science no sightings of the Malleefowl or Malleefowl nests were recoded. This involved twenty-three 40 minute and two 60 minute avifauna censuses conducted across nine sites surrounding the application areas (Biota Environmental Science, 2008). This species appears to be relatively common in the Ravensthorpe district compared to elsewhere in its range, however recent fauna surveys and historic information indicate it is not common within the application areas (Biota Environmental Science, 2008). Therefore the vegetation within the application areas is not likely to represent significant habitat for this

species.

The Chuditch (*Dasyurus geoffroyi*) is listed as Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008* (Biota Environmental Science, 2008). The Chuditch once had a distribution covering 70% of the Australian continent, however its range has now been greatly restricted (Orell & Morris, 2004). The major portion of the remaining populations occurs in Jarrah (*Eucalyptus marginata*) forests, but they are patchily distributed and at low densities (Orell & Morris, 2004). Male chuditches have a home range of approximately 15 kilometres, and females have been known to have a range of nearly 4 kilometres. In 1992 a single record of the Chuditch was noted in the Kundip town site near the application areas. No Chuditches were recorded in the recent fauna survey undertaken by Biota Environmental Science (Biota Environmental Science, 2008). Although it is possible the Chuditch may be present in the application areas, the clearing of 0.3 hectares of native vegetation is unlikely to represent significant habitat for this species given the relatively large home range they possess (Orell & Morris, 2004).

The Dibbler (*Parantechinus apicalis*) is listed as Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008* (Biota Environmental Science, 2008). This species was recorded near the application areas in 1986, in the town site of Kundip (Biota Environmental Science, 2008). Dibblers were once found across most of the south-west of Western Australia. Today, wild Dibblers survive at Fitzgerald River National Park near Albany and on Boullanger & Whitlock Islands (Department of the Environment, Heritage Water and the Arts, 2008). Although it is possible the Dibbler may be present in the application areas, it was not recorded during recent surveys undertaken by Biota Environmental Science (2008). Due to the relatively small size of the application areas (totaling 0.3 hectares), it is unlikely clearing in this proposal will represent significant habitat for this species.

A skink, *Lerista viduata* (no common name) is listed as priority 1 – taxa with few, poorly known populations on threatened land, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008* (Biota Environmental Science, 2008). This species is endemic to the Ravensthorpe Ranges, with most records coming from the south facing slopes north of the town site of Ravensthorpe (Biota Environmental Science, 2008). This species doesn't appear common in the application areas, with one specimen caught in a pitfall trap close to the application area during the recent fauna survey undertaken by Biota Environmental Science (2008). Although this skink does occur near the application areas it is unlikely the clearing of 0.3 hectares of native vegetation with a raised blade would constitute significant habitat for this species, given that this species prefers south facing slopes of the Ravensthorpe Ranges (Biota Environmental Science, 2008).

The Western Whipbird (*Psophodes nigrogularis oberon*) is listed as Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008* (Biota Environmental Science, 2008). They inhabit thick mallee or heath vegetation, feeding on insects from leaf litter, low branches and dead stumps (Department of Environment and Heritage Water and the Arts, 2008). The Western Whipbird was identified on six occasions over the Kundip Leases in the recent avifauna survey conducted by Biota Environmental Science, and is considered to be locally common in the Ravensthorpe district (Biota Environmental Science, 2008). Although the bird will be disturbed by the proposed clearing of 0.3 hectares, it is unlikely that clearing in the application area will represent significant habitat for this species.

The six species of fauna discussed above have been recorded in the vicinity or in the application areas, either historically or during the most recent fauna survey conducted by Biota Environmental Science. The following eight species of conservation significant fauna have not been recorded in the application areas, however due to suitable habitat or feeding grounds some of these species may occur in the application areas (Biota Environmental Science, 2008).

Common Name	Scientific Name	Conservation Status
Heath Rat	<i>Pseudomys shorridgei</i>	Schedule 1 under the <i>Wildlife Conservation Act 1950</i>
Western Ground Parrot	<i>Pezoporus wallicus flaviventris</i>	Schedule 1 under the <i>Wildlife Conservation Act 1950</i>
Carpet Python	<i>Morelia imbricate</i>	Schedule 4 under the <i>Wildlife Conservation Act 1950</i>
Peregrine Falcon	<i>Falco peregrinus</i>	Schedule 4 under the <i>Wildlife Conservation Act 1950</i>
Quenda	<i>Isoodon obesulus fusciventer</i>	Department of Environment and Conservation, Priority 4
Tammar	<i>Macropus eugenii derbianus</i>	Department of Environment and Conservation, Priority 4
Western Mouse	<i>Pseudomys occidentalis</i>	Department of Environment and Conservation, Priority 4
Western Brush Wallaby	<i>Macropus irma</i>	Department of Environment and Conservation, Priority 4

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

Although it is possible these species may occur in the application areas it is unlikely that the vegetation would represent significant habitat for these species. The reasons for this are as follows;

- The application area is relatively small totalling 0.3 hectares of native vegetation;

- Clearing will be conducted in a series of small drill lines with cleared areas generally not exceeding five metres in width;
- Clearing will be conducted with a raised blade; and
- Much of the area has been disturbed by historic mining.

Over 30 invertebrate taxa were recorded from the Kundip leases, many of which were not identified beyond family level. Only invertebrate taxa belonging to groups known to contain short range endemics or that were otherwise of conservation significance were identified to genus or species level (Biota Environmental Science, 2008). Two species of mygalomorph spiders from the family Nemesiidae were recorded from the Kundip leases; *Aname mainae* and *Cheistonia tepperi*. Both species (as they are currently recognised) have broad distributions through the south-west of Western Australia (Biota Environmental Science, 2008). A single *Borthriembryon* (land snail) that was not known to the WA Museum was collected during the survey from leaf litter at one sampling site. This site does not fall within any of the application areas, therefore the proposed clearing of 0.3 hectares in this application is not expected to represent significant habitat for this species.

Methodology Biota Environmental Science (2008)
Department of the Environment Heritage Water and the Arts (2008)
Orell & Morris (2004)
Tectonic Resources NL (2008)

(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

A Declared Rare Flora (DRF) and Priority flora (P) search was conducted in October 2005 by Craig (2005) over the application areas. In addition to this, three previous flora surveys were conducted by Craig in April 2004 (2004a), May 2004 (2004b), and November 2004 (2004c) within the application areas or in close proximity. These surveys were conducted to ascertain whether the native vegetation in the application areas is necessary for the continued existence of rare flora. These surveys revealed one species of DRF (*Marianthus mollis*) and six species of Priority flora occurring within the application areas. These species are listed in the table below;

Species	Status (<i>Wildlife Protection act, 1950</i>)	Total plants proposed to be impacted	Approximate number of plants on mining lease	Approximate number of plants in region (not on lease)
<i>Marianthus mollis</i>	DRF	136 plants	+1,500 plants	45,000 plants
<i>Melaleuca stramentosa</i>	Priority 1	729 plants	70 hectares	12 population locations
<i>Acacia disticha</i>	Priority 2	1 plant	17 population locations	13 population locations
<i>Acacia laricina var. crassifolia</i>	Priority 2	96 plants	130 population locations	16 population location
<i>Acacia durabilis</i>	Priority 3	65 plants	59 population locations	23 population locations
<i>Boronia oxyantha var. brevicalyx</i>	Priority 3	109 plants	29 population locations	19 population locations
<i>Siegfriedia darwinoides</i>	Priority 4	239 plants	37 population locations	36 population locations

(Tectonic Resources NL, 2008)

In total 1,277 plants of conservation significance will be impacted by this proposal. Species of highest concern due to their rarity or number of plants being cleared are *Marianthus mollis* (classified as DRF), *Melaleuca stramentosa* (Priority 1), *Acacia disticha* and *Acacia laricina var. crassifolia* (Biota Environmental Science, 2008).

Marianthus mollis is listed as Declared Rare Flora under the *Wildlife Conservation Act 1950* (Craig, 2004a). It is a low, spreading, mid-dense shrub which grows to 50 centimetres tall (Florabase, 2008). A total of 136 plants of this species occur with the application areas, which represents approximately 9 percent of the plants recorded on the Kundip leases. In the wider region, approximately 45,000 plants known to exist (Tectonic Resources NL, 2008). A permit is required from the Department of Environment and Conservation to take specimens of this species.

Tectonic Resources NL applied to take DRF under section 23F of the *Wildlife Conservation Act 1950*. Approval was granted to take 75 whole plants on the 17 December 2007 and 61 whole plants on 1 April 2008 (Biota Environmental Science, 2008). Taking this into account and given that 91 percent of the population on the Kundip leases will not be impacted, it is unlikely the clearing of 0.3 hectares of native vegetation will adversely impact the continued existence of this species. Furthermore *Marianthus mollis* also appears to germinate in disturbed conditions, with plants being recorded growing on fire breaks and historic exploration tracks (Craig, 2004a).

Melaleuca stramentosa is listed as Priority 1 under the *Wildlife Conservation Act 1950*. It is a robust shrub to 1 metre tall (Florabase, 2008). This species is very common on the Kundip leases, being the dominant shrub in

floristic community types (Ms) and (Ec), and co-dominant with *Melaleuca bracteosa* in (Mb) floristic community type (Craig, 2004a). Although many thousands of plants occur on the Kundip mining leases, *Melaleuca stramentosa* is very poorly known and appears to be very geographically restricted (Craig, 2004a). A total of 729 plants of this species occur within the application areas and will be impacted. Although a large number of plants from this species will be impacted by this proposal a further 70 hectares of native vegetation containing this species occur on the Kundip leases (Craig, 2004a). Therefore only a small proportion of the population of this species will be impacted. The vegetation in the application area is unlikely to represent significant habitat for this species.

Acacia disticha is listed as Priority 2 under the *Wildlife Conservation Act 1950* (Craig, 2004a). It is a spreading shrub to 2 metres tall often occurring in sand, rocky loam or limestone soils (Florabase, 2008). One plant from this species occurs within the application areas. This species has been recorded from 17 population locations on the Kundip mining leases, and 13 population locations outside of the leases (Craig, 2004a). Therefore only a very small proportion of the population of this species will be impacted. The vegetation in the application area is unlikely to represent significant habitat for this species.

Acacia laricina var. crassifolia is listed as Priority 2 under the *Wildlife Conservation Act 1950*. It is a domed, dense, spreading shrub, 0.25–0.5 metres high, preferring skeletal soils (Florabase, 2008). A total of 96 plants of this species occur within the application areas. This species is very common on the Kundip leases with 130 population locations being identified (Craig, 2004a). Therefore only a small proportion of the population of this species will be impacted. Clearing of 0.3 hectares of native vegetation in this proposal is unlikely to represent significant habitat for this species.

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

Although a high number of conservation significant flora occur within the application area, these species are considered to be locally common, dominating many of the floristic community types in the region (Craig, 2004a). *Morianthus mollis* (DRF) is one species which doesn't dominate floristic community types, however a permit to take DRF under section 23F of the *Wildlife Conservation Act 1950* was obtained by the proponent from the Department of Environment and Conservation. Furthermore the application area is small consisting of 0.3 hectares, reducing the impact on conservation significant flora. To further mitigate the impact of this proposal it is recommended that should the permit be granted rehabilitation condition be imposed.

Methodology Biota Environmental Science (2008)
Craig (2005)
Craig (2004a)
Craig (2004b)
Craig (2004c)
Florabase (2008)
Tectonic Resources NL (2008)

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

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

There are no known Threatened Ecological Communities (TEC) within the Tectonic Resources NL application areas (GIS Database). The nearest registered TEC occurs approximately 2 kilometres to the south of the application areas (GIS Database). This Threatened Ecological Community was based on the finding of two previously undescribed species; *Pultenaea sp. Kundip* and *Melaleuca sp. Kundip* (Craig, 2004a). These two species do not occur within the application area, therefore it is unlikely that the TEC would occur within the application area.

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

Methodology Craig (2004a)
Craig (2004b)
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 likely to be at variance to this Principle

The application areas are within the Interim Biogeographic Regionalisation of Australia (IBRA) Esperance Plains bioregion (GIS Database). According to Shepherd et al. (2001) there is approximately 51.1% of the pre-European vegetation remaining in the Esperance bioregion which places it as least concern according to the Department of Natural Resources and Environment (2002). One Beard vegetation association was located within the application area; 47 (GIS Database). There is approximately 35.6% of the pre-European vegetation remaining of Beard Vegetation Associations 47. This vegetation type is well represented in IUCN Class I-IV Reserves within the bioregion and in the state (refer to table below).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation status**	% of Pre-European area in IUCN Class I-IV Reserves (and current %)
IBRA Bioregion – Esperance Plains	2,899,944	1,483,240	~51.1	Least Concern	28.4 (54)
IBRA Subregion – Fitzgerald	1,570,670	844,885	~53.8	Least Concern	27.7 (50.5)
Local Government – Ravensthorpe	1,355,726	865,382	~59.3	Least Concern	N/A
Beard veg assoc. – State					
47	1,033,061	367,766	~35.6	Depleted	17.5 (48.4)
Beard veg assoc. – Bioregion					
47	959,947	334,881	~34.9	-Depleted	18.1 (51.2)
Beard veg assoc. – Subregion					
47	546,409	269,231	~49.3	-Depleted	30.6 (61.3)

* Shepherd et al. (2001) updated 2005

Whilst 49.9 percent of the sub-region has been cleared, the proposed clearing of 0.3 hectares is unlikely to significantly reduce the extent of Beard vegetation association 47 below current levels. Therefore the vegetation within the application areas is not likely to be a significant remnant in an area that has been extensively cleared. Furthermore, analysis of arial photography suggests the application areas occur in an extremely large area of uncleared vegetation (Approximately 500 kilometres squared).

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

Methodology Craig (2004a)
Department of Natural Resources and Environment (2002)
Shepherd et al (2001)
GIS Database:
- Interim Biogeographic Regionalisation of Australia

(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**
An ephemeral drainage line intersects the north-west of the application areas (GIS database). The drainage line in question is one of many minor, natural drainage channel that are widespread across the Ravensthorpe region (GIS database), which are likely to channel surface water after significant rainfall events.

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

Although an ephemeral drainage line intersects one of the application areas, the vegetation communities growing in association with the watercourses are not unique and are considered common and widespread within the Kundip mining leases (Craig, 2004a). The proposed clearing is unlikely to significantly impact vegetation communities growing in association with this minor ephemeral creek system. Furthermore, the proposed clearing will be undertaken with a raised blade aiding the ability of the vegetation to recover post exploration activities.

Methodology Craig (2004a)
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**
The application areas fall within a greenstone belt, with soils varying from skeletal, shallow and rocky on broken ground to mature deeply weathered red loams on lower even ground (Craig, 2004 a). A site visit to the Ravensthorpe Ranges in April 2008 was conducted by the assessing officer. The site under application was not

visited, however a site approximately 6 kilometres to the north was visited with similar geology and soils. No erosion was noted even in areas which had been previously cleared.

In order to minimise land degradation in this proposal, clearing of native vegetation will be undertaken with a raised blade. This will be undertaken with a rubber wheeled loader with a bucket lip 20 centimetres above the ground so that vegetation root stock is preserved and that windrows are not created (Tectonic Resources NL, 2008).

Department of Agriculture and Food Western Australia (DAFWA) (2006) identified the Ravensthorpe area as having a moderate to high salinity risk. The proposed clearing of 0.3 hectares of native vegetation in a segmented pattern for exploration purposes is unlikely to exacerbate salinity or soil erosion, provided the disturbed areas are rehabilitated after drilling is completed. In order to mitigate land degradation issues it is recommended a condition be placed on the permit for the purpose of rehabilitation.

Should saline water be intersected during RC drilling, Tectonic Resources NL have committed to collecting water in a sump and pumping it to one of the old workings in close proximity to the planned site (Tectonic Resources NL, 2008). To minimise the risk of land degradation Tectonic Resources NL have committed to;

- Using existing access tracks and old gridlines where possible;
- Using existing disturbed areas for drill pads; and
- Drilling multiple holes at different angles from the same drill pad (Tectonic Resources NL, 2008).

Employing these techniques will minimise the area of vegetation to be cleared thus reducing the risk of land degradation.

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

Methodology Craig (2004a)
Department of Agriculture and Food Western Australia (2006)
Tectonic Resources NL (2008)

(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 proposal is within the Fitzgerald Biosphere, one of only two biospheres in Western Australia. The Fitzgerald Biosphere has been recognised for its floral diversity internationally since 1978 as part of the United Nations Educational, Scientific and Cultural Organisation's (UNESCO) Man and the Biosphere Program (Environmental Protection Authority, 2006). The Fitzgerald Biosphere consists of an undisturbed core which is the majority of the Fitzgerald River National Park. Surrounding this area is a buffer area of uncleared bush and beyond this is the 'zone of co-operation' where a variety of agricultural activities, human settlements and other uses may be undertaken for the community's benefit. This proposal is within the 'zone of co-operation'.

The northern application areas occurs within an area of the Ravensthorpe Ranges recommended by the Environmental Protection Authorities Red Book to become a nature reserve; 3.8 Ravensthorpe Ranges (GIS Database). The Conservation through Reserves Committee (1974) recommend that the area be classified as a C class reserve and states that; biologically the area is worthy of A class protection, but it contains areas prospective for minerals. The Committee acknowledges that mineral production activities occurs in this region, and by recommending a C class classification instead of A class, it leaves scope for mineral activities to continue. This area has also been recognised as an Environmentally Sensitive Area by the Department of Environment and Conservation based on the Red Book recommendation, and has been listed by the Australian Heritage Commission on the Register of National Estate due to its high level of botanical diversity (Department of the Environment Heritage Water and the Arts, 2008). This proposed reserve is very different from the Fitzgerald River National Park and is a unique ecological niche in the state (Environmental Protection Authority, 2006). The impact of this proposal will be very minimal and is not expected to have an impact on the environmental values of the Ravensthorpe Ranges area

Mining has been a historical activity in the Kundip region since the late 1800s when copper-gold deposits were discovered. The application areas have been subject to historical exploration with previous drill lines and pads transversing the areas (Craig, 2004a). The proposed clearing of 0.3 hectares is a relatively small project with a minimal environmental impact (Tectonic Resources NL, 2008). The proposed clearing will be undertaken in the 'zone of co-operation' for the Fitzgerald Biosphere. This zone is understood as a region where people live and work. Therefore, the clearing of 0.3 hectares of native vegetation in this zone is not seen as being outside of the scope of its purpose.

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

The Ravensthorpe Ranges and the Fitzgerald Biosphere have been noted for there extremely high levels of biodiversity. Possible impact to this biodiversity other than clearing of the land may stem from dieback and weeds. To mitigate the possible impacts to the biodiversity to the region, it is recommended that conditions be placed on the permit for the purposes of dieback and weed management.

Methodology Conservation through Reserves Committee (1974)
Department of the Environment Heritage Water and the Arts (2008)
Environmental Protection Authority (2006)
Tectonic Resources NL (2008)
GIS Database:
- Clearing Regulations- schedule one 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**

The application areas do not fall within a Public Drinking Water Source Area (PDWSA) or PDWSA Protection Zone (GIS Database).

There are no surface water bodies present within the application areas, as drainage lines are ephemeral (GIS Database). Given the relatively small amount of vegetation to be cleared, it is unlikely that surface water quality would be affected by this proposal. Furthermore clearing will be undertaken with a raised blade leaving root system, which holds the soil together (Tectonic Resources NL, 2008). This would reduce the effects of sedimentation, if heavy rains were to prevail.

Groundwater within the application areas is saline, between 7,000 - 14,000 milligrams per litre of Total Dissolved Solids (TDS) (GIS Database). The proposed clearing is unlikely to have an impact on regional groundwater considering the size of the areas proposed to be cleared, and the magnitude of the Yilgarn south-west groundwater province, which is in excess of 246,000 square kilometres in area (GIS Database). Similarly, the proposal is unlikely to impact upon ecological communities that are wetland or groundwater dependent.

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

Methodology Tectonic Resources NL (2008)
GIS Database:
- Hydrography, linear
- Public Drinking Water Source Area
- Hydrography, Catchments

(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 areas lie on the Ravesthorpe ranges, and have a winter predominant rainfall pattern averaging approximately 426 millimetres per annum (BOM, 2008). The average annual evaporation rate is approximately 1800 millimetres (GIS Database), hence drainage channels in the area are seasonal; only flowing occasionally following significant rainfall events.

The clearing with a raised blade in this proposal, leaves roots mostly in tact. Roots and stems slow water movement and aid in water percolation, therefore reducing the risk of flooding, arising from this proposal.

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

Methodology BOM (2008)
GIS Database:
- Hydrography, linear
- Evaporation Isopleths

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

Comments

There is one native title claim over the application areas; WC96_109. This claim has been registered with the Native Title Tribunal on behalf of the claimant group (GIS Database). However, the mining 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 known Aboriginal Sites of Significance located within the clearing permit 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.

The Phillips River Gold Project was assessed by the Environmental Protection Authority (EPA) in January 2006. The Phillips River Gold Project was a proposal by Tectonic Resources NL to undertake mining in the areas of Trilogy on mining lease M74/153 and Kundip on mining leases M74/41, M74/51, **M74/53**, M74/135, M74/121,

M74/153 and L74/34, construct a haul road within M74/176, M74/51 and Gazetted road No. 8432, upgrade the processing plant situated east of Ravensthorpe on M74/13, and discharge process tailings to the existing pit on M74/13 (Environmental Protection Authority, 2006). This proposal was assessed by the EPA and provided the conditions the EPA set were followed, mining was allowed. This exploration program was not assessed by this EPA assessment.

M74/53 highlighted above is the mining lease which relates to this clearing application. Because the EPA assessed this mining lease in their assessment of the Phillip River Gold Project, information and recommendations were used in the assessment of this clearing application.

Methodology Environmental Protection Authority (2006)
 GIS Database:
 -Aboriginal Sites of Significance
 -Native Title Claims

4. Assessor's comments

Purpose	Method	Applied area (ha)/ trees	Comment
Mineral Exploration	Mechanical Removal	0.3	The proposal has been assessed against the clearing principles.
			The proposal has been assessed against the clearing principles and is at variance to Principles (a), (c) and (f), may be at variance to principles (b) and (h) and is not likely to be at variance to Principles (e), (g), (i) and (j).
			Should the permit be granted, it is recommended that Conditions be imposed on the permit for the purposes of record keeping, permit reporting, dieback and weed management and rehabilitation.

5. References

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Craig G.F. (2004a) Kundip Mining Leases M74/41, 51, 53 & 175 and P74/153: vegetation and flora survey. Unpublished report for Tectonic Resources NL, April 2004.

Craig G.F. (2004b) Kundip Haul Road: Declared Rare and Priority flora survey. Unpublished report for Tectonic Resources NL, May 2004.

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Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) Native Vegetation in Western Australia, Extent, Type and Status. Resource Management Technical Report 249. Department of Agriculture, Western Australia.

Tectonic Resources NL (2008) 'Phillip River Gold Project', unpublished report, Perth Western Australia.

6. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government.
CALM	Department of Conservation and Land Management, Western Australia.
DAFWA	Department of Agriculture and Food, Western Australia.
DA	Department of Agriculture, Western Australia.
DEC	Department of Environment and Conservation
DEH	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
DEP	Department of Environment Protection (now DoE), Western Australia.
DIA	Department of Indigenous Affairs
DLI	Department of Land Information, Western Australia.
DoE	Department of Environment, Western Australia.
DoIR	Department of Industry and Resources, Western Australia.
DOLA	Department of Land Administration, Western Australia.
DoW	Department of Water
EP Act	Environment Protection Act 1986, Western Australia.
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
GIS	Geographical Information System.
IBRA	Interim Biogeographic Regionalisation for Australia.
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
RIWI	Rights in Water and Irrigation Act 1914, Western Australia.
s.17	Section 17 of the Environment Protection Act 1986, Western Australia.
TECs	Threatened Ecological Communities.

Definitions:

{Atkins, K (2005). *Declared rare and priority flora list for Western Australia, 22 February 2005. Department of Conservation and Land Management, Como, Western Australia*} :-

- P1** **Priority One - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
- P2** **Priority Two - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
- P3** **Priority Three - Poorly Known taxa:** taxa which are known from several populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey.
- P4** **Priority Four – Rare taxa:** taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5–10 years.
- R** **Declared Rare Flora – Extant taxa (= Threatened Flora = Endangered + Vulnerable):** taxa which have been adequately searched for, and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.
- X** **Declared Rare Flora - Presumed Extinct taxa:** taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.

{Wildlife Conservation (Specially Protected Fauna) Notice 2005} [Wildlife Conservation Act 1950] :-

- Schedule 1** **Schedule 1 – Fauna that is rare or likely to become extinct:** being fauna that is rare or likely to become extinct, are declared to be fauna that is need of special protection.
- Schedule 2** **Schedule 2 – Fauna that is presumed to be extinct:** being fauna that is presumed to be extinct, are declared to be fauna that is need of special protection.
- Schedule 3** **Schedule 3 – Birds protected under an international agreement:** being birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction, are declared to be fauna that is need of special protection.
- Schedule 4** **Schedule 4 – Other specially protected fauna:** being fauna that is declared to be fauna that is in need of special protection, otherwise than for the reasons mentioned in Schedules 1, 2 or 3.

{CALM (2005). *Priority Codes for Fauna. Department of Conservation and Land Management, Como, Western Australia*} :-

- P1 Priority One: Taxa with few, poorly known populations on threatened lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P2 Priority Two: Taxa with few, poorly known populations on conservation lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P3 Priority Three: Taxa with several, poorly known populations, some on conservation lands:** Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P4 Priority Four: Taxa in need of monitoring:** Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.
- P5 Priority Five: Taxa in need of monitoring:** Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

Categories of threatened species (*Environment Protection and Biodiversity Conservation Act 1999*)

- EX Extinct:** A native species for which there is no reasonable doubt that the last member of the species has died.
- EX(W) Extinct in the wild:** A native species which:
- (a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
 - (b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
- CR Critically Endangered:** A native species which is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
- EN Endangered:** A native species which:
- (a) is not critically endangered; and
 - (b) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
- VU Vulnerable:** A native species which:
- (a) is not critically endangered or endangered; and
 - (b) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
- CD Conservation Dependent:** A native species which is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.