



# Clearing Permit Decision Report

## 1. Application details

### 1.1. Permit application details

Permit application No.: 4526/1  
Permit type: Purpose Permit

### 1.2. Proponent details

Proponent's name: Sandfire Resources NL

### 1.3. Property details

Property: Miscellaneous Licence 52/125  
Miscellaneous Licence 52/126  
Local Government Area: Shire of Meekatharra  
Colloquial name: DeGrussa Copper-Gold Project Borefield

### 1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
18		Mechanical Removal	Borefield Construction and Associated Activities

### 1.5. Decision on application

Decision on Permit Application: Grant  
Decision Date: 22 September 2011

## 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 for the whole of Western Australia. Two Beard vegetation associations have been mapped within the application area:</p> <p><b>18:</b> Low woodland; mulga (<i>Acacia aneura</i>); and <b>29:</b> Sparse low woodland; mulga, discontinuous in scattered groups (GIS Database).</p> <p>Botanists from Mattiske Consulting Pty Ltd (Mattiske) undertook flora and vegetation surveys over the greater Doolgunna project area in August 2009, and January, March and May 2010 (Mattiske, 2010). These surveys included the application area as well as the proposed sites of the DeGrussa Copper-Gold Mine, an airstrip, accommodation camps and exploration areas (Mattiske, 2010). Seven vegetation types were recorded within the application area (Mattiske, 2010; MBS Environmental, 2011).</p> <p><b>S1:</b> Open scrub of <i>Grevillea berryana</i>, <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia kempeana</i> over <i>Eremophila incisa</i>, <i>Eremophila margarethae</i>, <i>Eremophila forrestii</i> subsp. <i>forrestii</i>, <i>Ptilotus obovatus</i> and <i>Ptilotus schwartzii</i> over <i>Aristida contorta</i> and <i>Monochather paradoxus</i> on red/brown sandy loam flats with dolerite, ironstone and quartz (rarely) pebbles.</p> <p><b>S3:</b> Open scrub of <i>Acacia aneura</i> var. <i>aneura</i>, <i>Acacia ramulosa</i> and <i>Acacia tetragonophylla</i> over <i>Eremophila galeata</i> and <i>Senna artemisioides</i> subsp. <i>helmsii</i> over <i>Chrysopogon fallax</i> on red/brown clay loam flats.</p> <p><b>S8:</b> Open scrub of <i>Acacia tetragonophylla</i> and <i>Acacia ramulosa</i> over <i>Eremophila galeata</i> with occasional emergent <i>Psyrax latifolia</i> and <i>Eucalyptus lucasii</i> over mixed shrubs and grasses on flats of red/brown clay soils.</p> <p><b>LW1:</b> Low woodland of <i>Acacia aneura</i> var. <i>aneura</i>, <i>Acacia aneura</i> var. <i>microcarpa</i>, <i>Acacia pruinocarpa</i> and <i>Grevillea</i></p>	<p>Sandfire Resources NL has applied to clear up to 18 hectares of native vegetation, within an application area of approximately 69 hectares, for the purpose of borefield construction and associated activities. The construction and operation of the borefield will provide process water for the processing plant at the DeGrussa Copper-Gold Mine. The application area is located approximately 130 kilometres north-east of Meekatharra.</p> <p>The vegetation will be cleared using a bulldozer. The vegetation will be stockpiled and used in rehabilitation activities.</p>	<p>Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery, 1994).</p> <p>To:</p> <p>Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994).</p>	<p>The vegetation condition was assessed by botanists from Mattiske (2010).</p>

*berryana* over *Eremophila foliosissima*, *Eremophila forrestii* subsp. *forrestii* and *Eremophila galeata* over *Ptilotus* species and mixed grasses on red/brown sandy loam flats with ironstone pebbles.

**LW3:** Low woodland of *Acacia aneura* var. *microcarpa*, *Acacia pruinocarpa*, *Acacia sibirica*, *Acacia xanthocarpa*, *Grevillea berryana* with occasional emergent *Corymbia candida* subsp. *dipsodes* and *Corymbia ferritcola* over *Eremophila jucunda* subsp. *jucunda*, *Eremophila forrestii* subsp. *forrestii*, *Eremophila margarethae*, *Ptilotus schwartzii*, *Solanum lasiophyllum* and *Ptilotus obovatus* over mixed grasses on hills and flats with red/brown clay loam soil with ironstone and quartz (rarely).

**C4:** Scrub of *Acacia aneura* var. *aneura*, *Acacia aneura* var. *conifera*, *Acacia aneura* var. *microcarpa*, *Acacia cyperophylla* over *Psyrax latifolia*, *Eremophila galeata*, *Ptilotus obovatus* and mixed grasses with occasional emergent *Corymbia candida* subsp. *dipsodes* on flow-lines with ironstone and dolerite pebbles on red clay loam.

**C5:** Woodland of *Eucalyptus victrix* with emergent *Corymbia candida* subsp. *dipsodes* over *Acacia ramulosa*, *Acacia tetragonophylla*, *Acacia xanthocarpa* and *Acacia aneura* var. *microcarpa* over *Isotropis forrestii* and *Eremophila galeata* over mixed grasses on major flow-lines with red/brown clay loam soil.

### 3. Assessment of application against clearing principles

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

##### Comments

##### **Proposal is not likely to be at variance to this Principle**

The application area occurs within the Augustus Interim Biogeographic Regionalisation of Australia (IBRA) subregion (GIS Database). This subregion is generally described as rugged low Proterozoic sedimentary and granite ranges divided by broad flat valleys (CALM, 2002). The subregion also includes the Bryah Basin on the northern margin of the Yilgarn Craton (CALM, 2002), which is where the DeGrussa Copper-Gold Mine is situated (MBS Environmental, 2011). Mulga woodland with *Triodia* occur on shallow stony loams on rises, while the shallow earthy loams over handpan on the plains are covered by mulga parkland (CALM, 2002).

The vegetation within the application area is broadly mapped as Beard vegetation associations 18 and 29, both of which have approximately 100% of their pre-European vegetation extent remaining in the bioregion (Shepherd, 2009; GIS Database). Seven vegetation types were identified within the application area during a flora and vegetation survey by botanists from Mattiske (2010). Each of these vegetation types are well represented regionally and not considered locally significant (MBS Environmental, 2011).

A large flora and vegetation survey was undertaken over the Doolgunna project area by botanists from Mattiske in August 2009, and January, March and May 2010 (Mattiske, 2010). This survey included the application area as well as the proposed sites of the DeGrussa Copper-Gold Mine, an airstrip, accommodation camps and exploration areas (Mattiske, 2010). A total of 275 vascular plant taxa from 109 genera and 40 families were recorded during the survey (Mattiske, 2010). The most prominent families were Fabaceae, Poaceae and Scrophulariaceae and the taxa recorded are considered typical of the Gascoyne and Murchison regions (Mattiske, 2010). The results of the survey are consistent with the taxa that would be expected in a survey of the area (Mattiske, 2010).

No Declared Rare Flora (DRF) or Threatened Ecological Communities were recorded during the botanical survey by Mattiske (2010) or have previously been recorded within the application area (GIS Database).

Five Priority Flora species were recorded within the greater Doolgunna project area but none were recorded within the application area (Mattiske, 2010). One Priority Flora species, *Euphorbia ?sarcostemmoides*, is located approximately 25 metres south of the application area and will not be removed through the proposed clearing (MBS Environmental, 2011). The surrounding area was searched for additional plants of this species but none were found (MBS Environmental, 2011).

The application area is within the buffer of three Priority Ecological Communities (PECs). These PECs are the Robinson Range vegetation complexes (banded ironstone formation), Doolgunna calcrete groundwater assemblage type on Gascoyne palaeodrainage on Doolgunna Station, and Three Rivers calcrete groundwater assemblage types on Gascoyne palaeodrainage on Three Rivers Station (GIS Database). There is insufficient information to correctly define the vegetation complexes of the Robinson Range but it has been noted that it contains populations of the DRF *Pityrodia augustensis*, which the application area is not known to contain (Mattiske, 2010). Given that the application area does not occur on a banded ironstone formation (GIS

Database), the Robinson Range PEC is unlikely to occur within the application area. The Doolgunna Station PEC and Three Rivers Plutonic PEC are unique assemblages of invertebrates in groundwater calcretes (DEC, 2010). MBS Environmental has undertaken further assessment of the Doolgunna Station PEC and Sandfire Resources NL has mapped the outlines of outcropping calcrete in the area (MBS Environmental, 2011). No saturated calcrete was intersected in any of the groundwater exploration holes within or around the proposed borefield area or within Mining Lease 52/1046 (MBS Environmental, 2011). Therefore, the proposed borefield has no saturated calcrete or geology that is likely to support the subterranean fauna PECs and the proposed clearing is not likely to impact any PEC (MBS Environmental, 2011).

Seven introduced flora species were recorded in the larger Doolgunna project area during the flora and vegetation survey (Mattiske, 2010). These introduced species were Bipinnate Beggartick (*Bidens bipinnata*), *Cenchrus* sp., ?Iceplant (?*Mesembryanthemum crystallinum*), Pimpernel (*Lysimachia arvensis*), Prickly Paddy Melon (*Cucumis myriocarpus*), Ulcardo Melon (*Cucumis melo* subsp. *agrestis*) and Yellow Wood Sorrel (*Oxalis corniculata*) (Mattiske, 2010). Care must be taken to ensure that the proposed clearing activities do not spread or introduce weed species to non-infested areas. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

A Level 1 reconnaissance fauna survey was undertaken over the application area by Ninnox Wildlife Consulting in February 2011. The survey recorded 33 bird, two frog, five reptile and two introduced mammal species in the application area (Ninnox Wildlife Consulting, 2011). A greater number of species was expected but the survey was interrupted by heavy rainfall (Ninnox Wildlife Consulting, 2011). The fauna habitat type mapped over the majority of the application area is described as Mulga (*Acacia aneura*) scrub or low woodland over various *Eremophila* species on red/brown soils (MBS Environmental, 2011; Ninnox Wildlife Consulting, 2011). This fauna habitat type is common and widespread in the arid regions of Western Australia (Ninnox Wildlife Consulting, 2011) and is unlikely to support a high level of fauna diversity on a local or regional scale. However, some of the other fauna habitats present within the application area potentially support a wide range of bird species (Ninnox Wildlife Consulting, 2011). The larger creeklines where eucalypts and bloodwoods are present may provide nesting and refuge hollows that are not available in other habitats (Ninnox Wildlife Consulting, 2011). Environmental management procedures for the proposed clearing include locating infrastructure outside of drainage lines and riparian vegetation where possible; and retaining large trees, especially those with hollows, where possible (MBS Environmental, 2011).

Some of the vegetation of the application area has previously been disturbed by historical pastoral use and recent exploration activities (MBS Environmental, 2011).

Given that the vegetation types are well represented regionally and the fauna habitat types present are common in the locality (Ninnox Wildlife Consulting, 2011), the application area is not likely to comprise a higher level of biodiversity than the surrounding areas or on a regional scale.

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

<b>Methodology</b>	CALM (2002) DEC (2010) Mattiske (2010) MBS Environmental (2011) Ninnox Wildlife Consulting (2011) Shepherd (2009) GIS Database: - Declared Rare and Priority Flora List - Geology, 250K - IBRA WA (Regions - Subregions) - Pre-European Vegetation - Threatened Ecological Sites Buffered
--------------------	--

**(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.**

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

A vertebrate fauna assessment of the application area was undertaken by Ninnox Wildlife Consulting (2011). The assessment consisted of a data and literature review and a Level 1 reconnaissance survey in February 2011. The reconnaissance survey involved describing fauna habitat types, intensive bird observations, trapping of ground-dwelling vertebrate fauna, opportunistic sightings, hand foraging for inactive or cryptic species, foot transects using head torches to record nocturnal fauna, and observations of scats, tracks and diggings (Ninnox Wildlife Consulting, 2011).

Eight major fauna habitat types were identified within the larger DeGrussa project area and six of these fauna habitat types were mapped within the application area (Ninnox Wildlife Consulting, 2011).

- Fauna Habitat 1: consists of mainly Mulga (*Acacia aneura*) scrub or low woodland, over various *Eremophila* species on red/brown soils. This habitat occurs on flats between drainage lines and forms the greater part of the application area.
- Fauna Habitat 3: while similar in composition to Fauna Habitat 1, this habitat occurs in flow lines and,

as a result, the vegetation is denser than in other Mulga communities and the soils are likely to retain moisture for longer periods, probably resulting in a greater range of fauna species, particularly birds, being present. This habitat is present mainly in the northern section of the application area.

- Fauna Habitat 5: also occurs on red/brown soils between drainage lines, it lacks Mulga but includes a eucalypt tree component. This habitat forms an extremely minor component of the application area.
- Fauna Habitat 6: this habitat occurs in major drainage areas within the application area and is comprised of considerably more dense vegetation including larger eucalypts such as Coolibah (*Eucalyptus victrix*) and bloodwoods (*Corymbia candida*). Both of these are likely to provide hollows for nesting and refuge for a range of fauna species. Seasonal pools will also attract many species including feral and stock animals.
- Fauna Habitat 7: this habitat occurs at the far south-western portion of the application area and is a very minor component of the survey area. It was not assessed during the survey as access was not possible across the major creekline system.
- Fauna Habitat 8: this is an open scrub of Mulga and other *Acacia* species on red/brown clay loam flats within the application area.

Mulga woodlands and shrublands are common and widespread in the arid regions of Western Australia and some of those present within the application area are in relatively poor condition due to historical grazing pressure (Ninox Wildlife Consulting, 2011). None of the habitats assessed during the reconnaissance survey appear to be of particular significance to vertebrate fauna (Ninox Wildlife Consulting, 2011).

No fauna of conservation significance were recorded within the application area during the reconnaissance survey (Ninox Wildlife Consulting, 2011). The Australian Bustard (*Ardeotis australis*, Priority 4) has been recorded in the locality (GIS Database) and is highly likely to utilise the application area (Ninox Wildlife Consulting, 2011). The Australian Bustard is widespread, inhabits a range of habitats and is highly nomadic (Ninox Wildlife Consulting, 2011). The application area is unlikely to provide core habitat for this, or any other, conservation significant species.

The management strategies in place to mitigate potential impacts to fauna habitats from the proposed clearing include locating tracks to avoid large trees and shrubs where possible, and retaining trees with hollows for bird, bat and reptile habitat where possible (MBS Environmental, 2011).

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

**Methodology** MBS Environmental (2011)  
Ninox Wildlife Consulting (2011)  
GIS Database:  
- Threatened Fauna

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

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

According to available databases there are no known records of Declared Rare Flora (DRF) within the application area (GIS Database). The nearest record of DRF, *Pityrodia augustensis*, is located approximately 82 kilometres west of the application area (GIS Database).

A flora and vegetation survey was conducted over the application area and the surrounding Doolgunna project area by botanists from Mattiske in August 2009, and January, March and May 2010. No DRF were recorded during the survey (Mattiske, 2010).

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

**Methodology** Mattiske (2010)  
GIS Database:  
- Threatened and Priority Flora

**(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**

A search of available databases revealed there are no known Threatened Ecological Communities (TECs) within the application area (GIS Database). The nearest recorded TEC, Ethel Gorge aquifer stygobiont community, is located approximately 240 kilometres north of the application area (GIS Database).

No floristic TECs were identified during the flora and vegetation survey conducted by Mattiske botanists (Mattiske, 2010).

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

**Methodology** Mattiske (2010)

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 clearing application area falls within the Gascoyne Interim Biogeographic Regionalisation for Australia (IBRA) bioregion in which approximately 100% of the pre-European vegetation remains (see table) (Shepherd, 2009; GIS Database). This gives it a conservation status of 'Least Concern' according to the Bioregional Conservation Status of Ecological Vegetation Classes (Department of Natural Resources and Environment, 2002).

The vegetation of the clearing application area has been mapped as Beard vegetation associations:

- 18:** Low woodland; mulga (*Acacia aneura*); and
- 29:** Sparse low woodland; mulga, discontinuous in scattered groups (Shepherd, 2009; GIS Database).

According to Shepherd (2009), over 99% of both of these vegetation associations remain at a state level and 100% of vegetation remains at a bioregional level (see table). These vegetation associations would be given a conservation status of 'Least Concern' at both a state and bioregional level (Department of Natural Resources and Environment, 2002).

The vegetation under application is not a remnant of vegetation in an area that has been extensively cleared.

	Pre-European Area (ha)*	Current Extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion - Gascoyne	18,075,219	18,075,219	~100	Least Concern	~1.93
Beard vegetation associations - State					
18	19,892,305	19,890,275	~99.99	Least Concern	~2.13
29	7,903,991	7,903,991	~100	Least Concern	~0.29
Beard vegetation associations - Bioregion					
18	3,273,580	3,273,580	~100	Least Concern	~2.49
29	3,802,460	3,802,460	~100	Least Concern	~0.03

\* 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 - Subregions)  
 - Pre-European Vegetation

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

**Comments Proposal is at variance to this Principle**

According to available GIS Databases, there are no permanent watercourses or wetlands within the application area (GIS Database). There are two permanent wetlands, Bubbageealgunna Pool and Ealgareengunna Pool, and one non-perennial wetland, Noonyereena Pool, within 3.5 kilometres of the application area (MBS Environmental, 2011; GIS Database). The dominant drainage system in the vicinity of the application area is the headwaters of the Gascoyne South River and this crosses through the middle of the application area (MBS Environmental, 2011; GIS Database).

Two of the seven vegetation types mapped within the application area are associated with flow lines (Mattiske, 2010):

- C4: Scrub of *Acacia aneura* var. *aneura*, *Acacia aneura* var. *conifera*, *Acacia aneura* var. *microcarpa*, *Acacia cyperophylla* over *Psyrdrax latifolia*, *Eremophila galeata*, *Ptilotus obovatus* and mixed grasses with occasional emergent *Corymbia candida* subsp. *dipsodes* on flow-lines with ironstone and dolerite pebbles on red clay loam; and
- C5: Woodland of *Eucalyptus victrix* with emergent *Corymbia candida* subsp. *dipsodes* over *Acacia ramulosa*, *Acacia tetragonophylla*, *Acacia xanthocarpa* and *Acacia aneura* var. *microcarpa* over *Isotropis forrestii* and *Eremophila galeata* over mixed grasses on major flow-lines with red/brown clay loam soil.

Vegetation associated with watercourses accounts for approximately 28% of the 69 hectare application area (MBS Environmental, 2011). These riparian vegetation types have also been recorded in the surrounding region (Mattiske, 2010). Larger areas of vegetation types C4 and C5 have been mapped within the Doolgunna project area, with the extent of vegetation types C4 and C5 within the application area less than 1% of the total mapped area for each type within the greater project area (MBS Environmental, 2011).

Management strategies in place to minimise the clearing of riparian vegetation include locating infrastructure outside of drainage lines and associated vegetation communities where possible, and using existing tracks and disturbed areas where possible (MBS Environmental, 2011).

Based on the above, the proposed clearing is at variance to this Principle. However, similar riparian vegetation is common in the surrounding area (MBS Environmental, 2011). Given the small area of proposed clearing and the management strategies, the proposed clearing is unlikely to have any significant impact on any watercourse or wetland.

**Methodology** Mattiske (2010)  
MBS Environmental (2011)  
GIS Database:  
- Geodata, Lakes  
- Hydrography, Linear  
- Natmap 250K Series Mapping

**(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**

According to available datasets the available area intersects the Gascoyne, Three Rivers and Warri Land Systems (GIS Database).

A small portion of the application area is the Gascoyne Land System (GIS Database). The Gascoyne Land System is characterised by major river systems and associated narrow alluvial plains and inclusions (GIS Database). The vegetation generally consists of river redgum fringing woodlands, mulga and other acacias, sennas and buffel grass (GIS Database).

The Three Rivers Land System is characterised by hardpan plains and minor sandy banks supporting sparse mulga shrublands (Van Vreeswyk et al., 2004). Any disturbance which alters sheet water flow processes on the plains of this system are likely to have adverse impacts on the vegetation and much of the system is slightly to moderately susceptible to erosion (Van Vreeswyk et al., 2004).

The Warri Land System is characterised by low calcrete platforms and plains supporting mulga and cassia (senna) shrublands (Van Vreeswyk et al., 2004). Landform units with duplex soils, such as saline plains, are moderately susceptible to erosion; hardpan plains are less susceptible; and calcrete tables are not normally susceptible to erosion (Van Vreeswyk et al., 2004).

While some of the land forms present have the potential to erode, a number of management strategies will be adopted to minimise the risk of land degradation. These strategies include:

- Minimising the area requiring vegetation removal;
- Conducting topsoil-stripping activities during periods of low winds;
- Progressive rehabilitation of completed surfaces to minimise active areas exposed;
- Scarifying or deep ripping (as appropriate) compacted tracks and roads prior to rehabilitation;
- Minimising travel on roads during wet conditions; and
- Confining vehicle movements to defined haul roads and tracks (MBS Environmental, 2011).

Given the small size of the proposed clearing and the management strategies in place to reduce erosion, it is not likely that the proposed clearing will cause appreciable land degradation.

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

**Methodology** MBS Environmental (2011)  
Van Vreeswyk et al. (2004)

GIS Database:  
- Rangeland Land System Mapping

**(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**

According to available databases, part of the application area occurs within the former Doolgunna leasehold (GIS Database). The former pastoral lease was purchased by the Department of Environment and Conservation (DEC) and is managed by DEC for biodiversity conservation (DEC, 2011).

DEC (2011) have advised that the proposed borefield should be able to be rehabilitated to a self-sustaining state suitable for inclusion in the proposed conservation reserve. The closure objective listed in the DeGrussa Stage 2 Mining Proposal is to "rehabilitate disturbed areas to a state which is as close to a pre-disturbed condition as practically possible" and DEC have deemed this as appropriate (DEC, 2011). Therefore the impacts on the conservation area are unlikely to be significant in the long-term.

The proposed clearing being located within the former Doolgunna leasehold poses a risk of spreading weeds into the conservation area. Sandfire Resources NL have committed to engaging with DEC on the management of weeds, as well as feral animal control, bushfire prevention and closure planning (MBS Environmental, 2011). Potential impacts to the conservation area may be minimised by the implementation of a weed management condition.

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

**Methodology** DEC (2011)  
MBS Environmental (2011)  
GIS Database:  
- DEC Tenure

**(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 area is situated in a semi-arid region where the pan evaporation rates are 12 to 15 times greater than the average annual rainfall (MBS Environmental, 2011). This environment typically results in a low recharge rate (MBS Environmental, 2011). Comprehensive water quality analyses will be conducted annually at each of the production bores within the application area according to the Groundwater Operating Strategy (MBS Environmental, 2011).

According to available databases the application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database). The nearest PDWSA is Meekatharra Water Reserve, which is approximately 116 kilometres to the south-west (GIS Database). The proposed clearing is unlikely to affect the water quality of the water reserve due to the large distance between it and the application area.

There are no permanent watercourses or wetlands within the application area (GIS Database). The dominant drainage system in the vicinity of the application area is the headwaters of the Gascoyne South River and this crosses through the middle of the application area (MBS Environmental, 2011; GIS Database). All the local watercourses are ephemeral and likely to carry runoff following significant rainfall events (MBS Environmental, 2011). Where runoff does not drain into the watercourses it traverses the site as shallow sheet flow (MBS Environmental, 2011). The proposed clearing is not anticipated to cause a long term impact on the quality of surface water as the low density of vegetation and arid climate act to minimise the effect of vegetation removal on surface water quality (MBS Environmental, 2011).

The small amount (18 hectares) of proposed clearing is unlikely to cause deterioration in the quality of surface or underground water.

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

**Methodology** MBS Environmental (2011)  
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 application area is located in low lying areas associated with the Gascoyne South River which may occasionally be at risk of flooding following intense rainfall events (MBS Environmental, 2011). The watercourses and drainage lines in the immediate vicinity of the application area are ephemeral and are dry for the majority of the year. Flows will occur periodically predominantly during summer when the potential for high

intensity rainfall is greatest (MBS Environmental, 2011). Some localised increase in surface runoff may occur where vegetation is cleared but the impact is unlikely to be detectable in the context of the natural variability of runoff (MBS Environmental, 2011).

On a larger scale, the application area is located within the Gascoyne River catchment area (GIS Database). Given the size of the area to be cleared (18 hectares) in relation to the size of the catchment area (8,039,088 hectares) (GIS Database), the proposed clearing is not likely to increase the potential of flooding or its intensity on a catchment scale.

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

**Methodology** MBS Environmental (2011)  
GIS Database:  
- Hydrographic Catchments - Catchments

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

##### **Comments**

The clearing permit application was advertised on 8 August 2011 by the Department of Mines and Petroleum inviting submissions from the public. A submission regarding Aboriginal heritage matters was received.

There are three Native Title Claims (WC99/13, WC99/46 and WC06/2) over the area under application (GIS Database). These claims have been registered with the National Native Title Tribunal on behalf of the claimant groups. 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.

**Methodology** GIS Database:  
- Aboriginal Sites of Significance  
- Native Title Claims - Determined by the Federal Court  
- Native Title Claims - Registered with the NNTT

#### **4. References**

- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions. Gascoyne 3 (GAS3 - Augustus Subregion). Department of Conservation and Land Management, Western Australia.
- DEC (2010) Priority Ecological Communities for Western Australia Version 15. Species and Communities Branch, Department of Environment and Conservation, December 2010.
- DEC (2011) Advice for Sandfire Resources - Purpose Permit Application: DeGrussa Copper-Gold Project Borefield. Advice to Assessing Officer, Native Vegetation Assessment Branch, Department of Mines and Petroleum (DMP), Received 8 August 2011. Department of Environment and Conservation, Western Australia.
- Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Mattiske (2010) Flora and Vegetation Survey of the Doolgunna Project. Unpublished Report Prepared by Mattiske Consulting Pty Ltd for Sandfire Resources NL, June 2010.
- MBS Environmental (2011) Purpose Permit Application: DeGrussa Copper-Gold Project Borefield Native Vegetation Management Plan and Assessment of Clearing Principles. Unpublished Report Prepared by MBS Environmental for Sandfire Resources NL, July 2011.
- Ninox Wildlife Consulting (2011) A Level 1 Vertebrate Fauna Assessment of the Sandfire Resources NL DeGrussa Copper-Gold Project, North of Meekatharra, Western Australia (Borefield and Airstrip). Unpublished Report Prepared by Ninox Wildlife Consulting for Sandfire Resources NL.
- Shepherd, D.P. (2009) Adapted from: Shepherd, D.P., Beeston, G.R., and Hopkins, A.J.M. (2001), Native Vegetation in Western Australia. Technical Report 249. Department of Agriculture Western Australia, South Perth.
- Van Vreeswyk, A.M.E., Payne, A.L., Leighton, K.A. and Hennig, P. (2004) Technical Bulletin - An Inventory and Condition Survey of the Pilbara Region, Western Australia, No. 92. Department of Agriculture, Government of Western Australia, Perth, Western Australia.



## 5. Glossary

### Acronyms:

<b>BoM</b>	Bureau of Meteorology, Australian Government
<b>CALM</b>	Department of Conservation and Land Management (now DEC), Western Australia
<b>DAFWA</b>	Department of Agriculture and Food, Western Australia
<b>DEC</b>	Department of Environment and Conservation, Western Australia
<b>DEH</b>	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
<b>DEP</b>	Department of Environment Protection (now DEC), Western Australia
<b>DIA</b>	Department of Indigenous Affairs
<b>DLI</b>	Department of Land Information, Western Australia
<b>DMP</b>	Department of Mines and Petroleum, Western Australia
<b>DoE</b>	Department of Environment (now DEC), Western Australia
<b>DoIR</b>	Department of Industry and Resources (now DMP), Western Australia
<b>DOLA</b>	Department of Land Administration, Western Australia
<b>DoW</b>	Department of Water
<b>EP Act</b>	Environmental Protection Act 1986, Western Australia
<b>EPBC Act</b>	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
<b>GIS</b>	Geographical Information System
<b>ha</b>	Hectare (10,000 square metres)
<b>IBRA</b>	Interim Biogeographic Regionalisation for Australia
<b>IUCN</b>	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
<b>RIWI Act</b>	Rights in Water and Irrigation Act 1914, Western Australia
<b>s.17</b>	Section 17 of the Environment Protection Act 1986, Western Australia
<b>TEC</b>	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.