



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 3409/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **Crescent Gold Limited**

1.3. Property details

Property: Miscellaneous Licence 38/120
Mining Lease 38/73
Mining Lease 38/261
Local Government Area: Shires of Laverton and Menzies
Colloquial name: Fish to Burtville Haul Road

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
205		Mechanical Removal	Road construction and maintenance

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description Beard Vegetation Associations have been mapped at a scale of 1: 250,000 for the whole of Western Australia. Three Beard Vegetation Associations are located within the application area (Shepherd, 2007):

- Beard Vegetation Association 18: low woodland; Mulga (*Acacia aneura*);
- Beard Vegetation Association 389: succulent steppe with open low woodland; Mulga over Saltbush;
- Beard Vegetation Association 1239: hummock grassland; open medium tree and Mallee steppe; Marble gum and Mallee (*Eucalyptus youngiana*) over hard Spinifex *Triodia basedowii* on sandplain.

Western Botanical conducted a flora and vegetation survey of the application area in July and October 2007. Sixteen vegetation units were identified within the application area (Western Botanical, 2008):

Stony Ironstone Mulga Shrublands (SIMS)

The Stony Ironstone Mulga Shrubland vegetation unit occurred on gentle slopes towards the north-western end of the proposed Fish Haul Road and occupied 3.8 kilometres or 6.6%. The substrate was typically a dusky-red sandy loam with abundant surrounded ironstone pebbles at the surface. Vegetation was dominated by *Acacia aneura* and *A. ramulosa* var. *ramulosa* scrub (15% Projected Foliage Cover (PFC), 4 metres tall) over *Eremophila forrestii* subsp. *forrestii* and *Scaevola spinescens* low scrub (20% PFC, 1 metre tall). The Priority 1 taxon, *Phyllanthus baeckeoides* was recorded within the SIMS vegetation unit.

Granite Rock Mulga Shrubland (GRMS)

Granite Rock Mulga Shrubland was restricted to a small isolated area of the proposed Fish Haul Road and occupied 0.38 kilometres or 0.67%. This vegetation unit was associated with shallow sandy soils over granite. Vegetation was dominated by *Acacia quadrimarginea* and *A. aneura* open scrub (10% PFC, 3 metres tall) over *Dodonaea rigida*, *Eremophila latrobei* subsp. *latrobei* and *Sida* sp. unisexual open low scrub (5% PFC, 1.5 metres tall).

Stony Quartz Mulga Shrubland (SQMS)

Stony Quartz Mulga Shrubland was located on slopes associated with the breakdown of granite. SQMS was restricted to several small areas along the proposed Fish Haul Road, totalling 6.2 kilometres or 10.8%. The substrate was reddish sandy loam with abundant quartz fragments at the surface. Vegetation was dominated by *Acacia aneura*, *A. burkittii* and *A. ramulosa* var. *ramulosa* scrub (15% PFC, 3.5 metres tall) over *Senna cardiosperma*, *S. artemisioides* subsp. *filifolia*, *Eremophila forrestii* var. *forrestii* and *Scaevola spinescens* low scrub (20% PFC, 1.2 metres tall).

Greenstone Acacia Shrubland (GAS)

Greenstone *Acacia* shrubland was restricted to two small areas of the proposed Fish Haul Road and occupied 0.74 kilometres or 1.3%. This vegetation unit occurred on slopes with a rocky greenstone substrate. Vegetation was dominated by *Acacia grasbyi*, *A. burkittii* and *A. ramulosa* var. *ramulosa* scrub (20% PFC, 2.5 metres tall) over *Senna cardiosperma*, *Dodonaea lobulata*, *D. rigida* and *Scaevola spinescens* open low scrub (8% PFC, 1.5 metres tall) over *Halgania integerrima* and *Chrysocephalum puteale* scattered low shrubs (<2% PFC, 0.4 metres) over *Aristida contorta* and *Enneapogon caeruleus* scattered grasses (<2% PFC, 0.2 metres tall).

Calcophytic Casuarina – Acacia Woodland / Shrubland (CCAS)

Calcophytic *Casuarina* – *Acacia* Woodland Shrubland was restricted to several small areas along the length of the proposed Fish Haul Road, totalling 2.8 kilometres or 4.9%. These areas were characterised by an abundance of calcareous fragments at the surface and shallow soils. Vegetation was dominated by *Casuarina pauper* open low woodland (<10% PFC, 12 metres tall) over *Eremophila scoparia*, *Dodonaea rigida* and *Senna artemisioides* subsp. *filifolia* low scrub (20% PFC, 1.8 metres tall) over *Paspalidium basicladum* and *Enneapogon caeruleus* scattered grasses (<2% PFC, 0.3 metres tall).

Stony Plain Mulga Shrubland (SPMS)

This vegetation unit was restricted to a single location occupying 1.68 kilometres or 2.95%, towards the north-eastern end of the proposed Fish Haul Road on a colluvial outwash plain. This area was close to Merolia Station and vegetation appears to have suffered from grazing in the past. Vegetation was dominated by *Acacia aneura* scrub (20% PFC, 4 metres tall) over *Eremophila forrestii* subsp. *forrestii*, *E. latrobei* subsp. *latrobei*, *Phyllothea tomentella* and *Spartothamnella teucriflora* low scrub (15% PFC, to 1 metre tall) over *Enneapogon caeruleus* and *E. ?polyphyllus* scattered grasses (<2% PFC, 0.2 metres tall).

Mulga Wandarie Grassy Shrubland (MUWA)

This vegetation unit covered a substantial area over the length of the proposed Fish Haul Road (10.34 kilometres) totalling 18%. MUWA occurred on red sand, commonly with an abundance of ironstone gravel on the surface. Vegetation was dominated by *Acacia aneura* scrub (15% PFC, 4 metres tall) over *Ptilotus obovatus*, *Eremophila margarethae* and *Prostanthera althoferi* subsp. *althoferi* scattered shrubs (<2% PFC, to 1 metre tall) over *Eragrostis eriopoda* and *Monochather paradoxa* open grasses (25% PFC, 0.4 metres tall). Towards the south-eastern end of the Fish Haul Road the lower stratum of MUWA became dominated by smaller grasses such as *Aristida contorta*, *Enneapogon ?polyphyllus* and *E. caeruleus*.

Sandplain Spinifex Hummock Grassland (SASP)

This vegetation unit was extensive across the deep sandplains of the proposed Fish Haul Road occupying 14.71 kilometres or 26%. The SASP vegetation unit was complex and could be further divided into several subunits likely relating to fire history and soil depth. The subunits were not delineated at this scale. SASP was typically dominated by *Eucalyptus gongylocarpa* low woodland (15% PFC, 15 metres tall) over *Triodia basedowii* hummock grassland (40% PFC, 0.5 metres tall). Whilst the shrub component was relatively sparse, the diversity was high. Large areas of SASP were mallee dominated, predominantly *Eucalyptus youngiana* and *E. oleosa* subsp. *oleosa*. In a few restricted areas eucalypts were absent and vegetation was dominated by *Melaleuca ?hamata* shrubland. Three Priority 3 species of *Bossiaea eremaea*, were located in long unburnt SASP.

Sandplain Mulga – Spinifex Shrubland (SAMU)

SAMU occurred on deep sandplains and was widespread along the proposed Fish Haul Road, occupying 10.13 kilometres or 18%, it was commonly intergraded with the SASP vegetation community. Vegetation was dominated by *Acacia aneura* low woodland (20% PFC, 5 metres tall) over *Triodia basedowii* hummock grassland (35% PFC, 0.5 metres tall). The Priority 1 flora species, *Phyllanthus baeckeoides* was recorded in one location of SAMU.

Frankenia Low Shrubland (FRAN)

This vegetation unit was located at the base of duricrust breakaways, restricted to a small portion of the proposed Fish Haul Road totalling 2.2 kilometres or 3.85%. Vegetation was dominated by *Hakea preissii*, *Acacia aneura* scattered tall shrubs over *Frankenia setose*, *Maireana pyramidata* and *Atriplex bunburyana* low shrubs.

Calcophytic Pearl Bluebush Shrubland (CPBS)

CPBS occurred at a single location at the southernmost point of the proposed Fish Haul Road occupying 0.87 kilometres or 1.5%. There was clear evidence of historical pastoral activity in this area. Vegetation was dominated by *Acacia aneura* and *Eremophila oldfieldii* subsp. *angustifolia* scattered tall shrubs over *Maireana sedifolia* and *M. pyramidata* low chenopod shrubland (20% PFC, 0.8 metres tall) over scattered grasses.

Samphire Low Shrubland (SAMP)

Samphire Low Shrubland occurred at two small isolated areas along the proposed Fish Haul Road alignment on a saline flat, totalling 1.07 kilometres or 1.8%. Vegetation was dominated by two *Halosarcia* species and *Frankenia punctata* dwarf shrubland (30% PFC).

Melaleuca – Chenopod Shrubland (MCS)

MCS occurred on the dunes up from the saline flat totalling 0.54 kilometres. Vegetation was dominated by *Melaleuca xerophylla* scrub (25% PFC, 3 metres tall) over various chenopods.

Kopi Dune Woodland (KOPI)

KOPI vegetation occurred on the raised dune systems associated with saline areas, which was restricted to 0.74 kilometres or 1.3%. Vegetation was dominated by *Eucalyptus lesouefii* woodland (15% PFC, 15 metres tall) over *Eremophila scoparia*, *Dodonaea viscosa* subsp. *angustissima* and *Senna artemisioides* subsp. *filifolia* open scrub (5% PFC, 1.5 metres tall) over scattered grasses. The Priority three taxon *Melaleuca apostiba*, was collected from KOPI.

Drainage Tract Mulga Shrubland (DRMS)

DRMS was restricted to flat areas/ groves associated with drainage lines and covered 0.78 kilometres or 1.37%. Vegetation composition was highly variable and largely depended on the vegetation surrounding. This vegetation type appeared to have suffered some degree of pastoral grazing in the past. DRMS was dominated by *Acacia aneura* low forest (35% PFC, 5 metres tall) over a variable shrub layer.

Open Drainage Line Shrubland (ODR)

Vegetation was dominated by scattered *Acacia aneura* over sparse shrubs such as *Eremophila forrestii*, *Ptilotus obovatus*, and *Senna cardiosperma*. These areas covered 1.19 kilometres and showed impacts of heavy grazing from pastoral activity.

Clearing Description

Crescent Gold (2009) proposes to clear up to 205 hectares of native vegetation, within a larger area equalling approximately 302 hectares. The western end of the proposed clearing is located approximately 25 kilometres south-east of Laverton whilst the eastern end is located approximately 85 kilometres south-east of Laverton (GIS

Database).

The purpose of the proposed clearing is for the construction and maintenance of the proposed Fish to Burtville haul road (Crescent Gold, 2009). The road will be approximately 61 kilometres long and 32 metres wide with an extra 10 metres for associated infrastructure. Vegetation will be cleared by bulldozer or other heavy plant machinery and vegetation and topsoil will be stockpiled for rehabilitation purposes.

Vegetation Condition Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery, 1994).

To

Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery, 1994).

Comment The vegetation condition rating is derived from information provided by Western Botanical (2008). Western Botanical (2008) reports that vegetation has been impacted by pastoral activity and this is particularly evident around drainage flats and plains. Furthermore, fire history has played an important part in shaping the vegetation patterns, particularly on the spinifex dominated sandplains (Western Botanical, 2008).

For the majority of the proposed Fish to Burtville haul road route the haul road is to be constructed parallel and directly to the east of the existing Merolia to Coggia road (Crescent Gold, 2009). Crescent Gold (2009) reports that there will be a safety gap of uncleared bush between the public road and the haul road of approximately 8 metres, however in some instances the haul road alignment will cross over the Coggia to Merolia public road.

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 is located within the East Murchison subregion of the Murchison Interim Biogeographic Regionalisation of Australia (IBRA) bioregion and the Shield subregion of the Great Victoria Desert IBRA bioregion (GIS Database).

The East Murchison subregion is described by CALM (2002) as being rich and diverse in both its flora and fauna. CALM (2002) reports that most species are wide ranging and usually occur in at least one, and often several, adjoining subregions.

CALM (2002) reports that the Shield subregion contains yellow sandplain communities with very diverse mammalian and reptile fauna and distinctive plant communities. Threats to these communities are in the form of mining, extensive summer wildfires and feral predators (CALM, 2002). In addition, CALM (2002) reports that hummock grasslands, open low tree steppe (Mulga over *Triodia scariosa*) are confined entirely to this subregion.

Western Botanical conducted a flora and vegetation survey of the application area in July 2007 (Western Botanical, 2008). A total of 175 plant taxa representing 36 families and 77 genera were recorded along the proposed haul road alignment (Western Botanical, 2008). Western Botanical (2008) reports the following families as representing the majority of the flora; *Chenopodiaceae* (21), *Mimosaceae* (20), *Myoporaceae* (18), *Myrtaceae* (17), *Poaceae* (13), *Papilionaceae* (9), *Asteraceae* (9) and *Proteaceae* (7). Western Botanical (2008) has concluded that these results represent fairly typical flora diversity for this region.

No weed species were recorded during the flora and vegetation survey of the application area (Western Botanical, 2008), however, there is a high possibility that weed species would be present in some parts of the application area. The presence of introduced weed species lowers the biodiversity value of the proposed clearing area. Care must be taken to ensure that the proposed clearing activities do not spread or introduce weed species to non-infested areas. Should a permit be granted, it is recommended that a condition be imposed for the purpose of weed management.

MBS Environmental conducted a fauna survey of the application area in September 2009. This survey identified 39 bird species, six native mammal species and 11 reptile species within the search area, however, 36 native and seven introduced mammals, 157 birds, 87 reptiles and nine frog species have the potential to occur within the area based on previous surveys and Western Australian Museum collections of fauna species (MBS Environmental, 2009). It is expected that more reptiles and bird species would frequent the search area than were recorded during the fauna survey. MBS Environmental (2009) reports that the small number of reptiles observed during the survey may be attributed to the cool weather conditions experienced during the mornings and nights of the fauna survey.

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

Methodology CALM (2002)
MBS Environmental (2009)

(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

MBS Environmental conducted a fauna survey of the application area in 2009. This survey consisted of a desktop analysis of the following sources to identify fauna species that could potentially occur within the search area (MBS Environmental, 2009):

- previous fauna surveys that have been conducted in the region;
- a review of the Department of Environment and Conservation's (DEC's) online database (NatureMap);
- DEC's Threatened and Priority species database; and
- the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA) online database to identify fauna species protected under the *Environment Protection and Biodiversity Conservation Act, 1999* that could potentially occur within the area.

In addition, a reconnaissance site visit was conducted from 2 to 10 September 2009. During this visit sites were traversed on foot and by vehicle. MBS Environmental (2009) reports that direct observation of fauna encountered, as well as indirect indications of the presence of fauna such as tracks and scats were used to compile a list of vertebrate species occurring in the area. Photographs were taken of the faunal habitats (MBS Environmental, 2009).

MBS Environmental (2009) reports that densely vegetated habitats and habitats supporting hummock grasses contained the most abundant fauna. These habitats are listed below:

Calcopytic Casuarina – Acacia Woodland Shrubland (CCAS)

Casuarina pauper (5 to 10 metres) over a mixed shrub layer including *Acacia*, *Senna*, *Dodonaea* and *Eremophila* spp. on rocky brown loam. Large *Casuarinas* have abundant coarse woody debris and litter layer beneath the canopy. Large *Brachychiton gregorii* (>7 metres). Habitat trees were also located within this habitat. Bird sightings included Grey Shrike-thrush (*Colluricincla harmonica*), Rufous Whistler (*Pachycephala rufiventris rufiventris*), Mulga Parrot (*Playcerus varius*), Wedge-tailed Eagle (*Aquila audax*), Willy Wagtail (*Rhipidura leucophrys leucophrys*), Spiny-cheeked Honeyeater (*Acanthagenys rufogularis*), Singing Honeyeater (*Lichenostomus virescens*), Hooded Robin (*Melanodryas cucullata*), Welcome Swallow (*Hirundo neoxena*), Red-backed Kingfisher (*Todiramphus pyrrhopygia*), Mistletoe Bird (*Dicaeum hirundinaceum hirundinaceum*), Inland Thornbill (*Acanthiza apicalis*), Chestnut-rumped Thornbill (*Acanthiza uropygialis*) and White-browed Babblers (*Pomatostomus superciliosus*). Reptile sightings included *Ctenophorus isolepis* and *Ergenia depressa*. This habitat comprised 5% of L38/120.

Sandplain Mulga Spinifex Shrubland (SAMU)

Acacia aneura canopy (>5 metres) and occasional Mallee (*Eucalyptus youngiana*) over *Acacia* with *Eremophila* spp. shrubs over moribund Spinifex on sandy orange loam. Abundant coarse woody debris. Bird sightings included Crested Bellbird (*Oreoica gutturalis*) and the Black-faced Cuckoo Shrike (*Coracina novaehollandiae*). This habitat comprised 18% of L38/120.

Sandplain Spinifex Hummock Grassland (SASP)

Eucalyptus gongylocarpa (15 metres) with *Eucalyptus youngiana* (Large-fruited Mallee) and *E. oleosa* (Cowcowing Mallee) canopy over intermittent highly variable shrub layers which included *Eremophila*, *Dodonaea*, *Scaevola*, *Olearia* and *Acacia* spp. over spinifex on deep red sands. Coarse woody debris and abundant leaf litter under Mallees. Observations included *Ctenophorus* sp. burrows, Hopping mice (*Notomys* sp.), Planigale (*Planigale* sp.), Dunnart (*Sminthopsis* sp.) and *Varanus* sp. tracks and a Red Kangaroo (*Macropus rufus*) carcass. Bird sightings included Weebills (*Smicronis brevirostris*), Brown Falcon (*Falco berigora berigora*), Striated Pardilote (*Pardilotus striatus*), Pied Butcherbird (*Cracticus nigrogularis*), Grey Shrike-thrush, Black-faced Cuckooshrike, Yellow-throated Miner (*Manorina flavigula*), Crested Pigeon (*Ocyphaps lophotes*), Grey-headed Honeyeater (*Lichenostomus keartlandi*), Black Honeyeater (*Certhionyx niger*) and the Crested Bellbird. This habitat comprised 25% of L38/120. Part of this habitat has been altered by fire where Mallee (*Eucalyptus youngiana*) over spinifex was the dominant vegetation type.

Kopi Dune Woodland (KOPI) (includes Melaleuca Chenopod Shrubland)

Very open *Eucalyptus lesouefii* (Goldfields Blackbutt) (15 metres) woodland over mixed *Acacia* spp. *Ptilotus*, *Senna* and *Maireana* spp. over some Spinifex and grasses on pale calcareous sandy rise associated with dune system and saline areas. Trees have lots of hollows suitable for bird nesting. Coarse woody debris and leaf litter also provide habitat for fauna. Observations included Short-beaked Echidna (*Tachyglossus aculeatus*) scats. Bird sightings included Chestnut-rumped Thornbill, Striated Pardilote, Magpie (*Gymnorhina tibicens*) and the Weebill. This habitat comprised 2% of L38/120.

Stone Quartz Mulga Shrubland (SQMS)

Acacia aneura (>5 metres) with occasional *Eucalyptus* sp. and *Brachychiton gregorii* canopy over a sparse mixed *Acacia* spp. shrub layer, groundcover sometimes totally absent on a rocky quartz hard orange brown

loam. Abundant coarse woody debris was present in some places. Quartz pebbles were observed throughout lower lying areas and less densely spread on upper areas where vegetation tended towards Stony Mulga Shrubland. Bird sightings included Red-capped Robin (*Petroica goodenovii*), Hooded Robin, Yellow-rumped Thornbill (*Acanthiza chrysorrhoa*), Slaty-backed Thornbill (*Acanthiza robustirostris*), Black-faced Cuckooshrike, Singing Honeyeater, Spiny Cheeked Honeyeater, Chestnut-rumped Thornbill, Rufous Whistler and the Crested Bellbird. Reptiles sighted included *Ctenophorus scutalatus*. Other observations included Dog or Dingo tracks and Historic Pebble-mound Mouse nests (*Pseudomys* sp.). This habitat comprised 8% of L38/120.

Drainage Mulga (Drainage Tract Mulga and Open Drainage Line)

Open *Acacia aneura* canopy (>5 metres) with occasional *Brachychiton gregorii* over a highly variable shrub layer including mixed *Acacia*, *Ptilotus* and *Sida* spp. and some grasses. Coarse woody debris and leaf litter was abundant in densely vegetated areas and almost absent in degraded drainages. Where there was litter layer termites were very active. Some drainage areas in the survey area have been used as a source of wood. Observations included Short-beaked Echidna diggings, Hopping Mouse tracks (*Notomys* sp.) and *Varanus* sp. burrows. Bird sightings included Singing Honeyeater. Reptile sightings included *Gehyra variegata*, *Heteronotia binoei* and *Lerista* sp.. This habitat comprised 3.5% of L38/120.

MBS Environmental (2009) reports that some of these habitats may be suitable for conservation significant fauna although there were no conservation significant species recorded during the survey. The proposed clearing may cause fragmentation of fauna habitat, particularly in more densely vegetated areas. Crescent Gold (2009) have committed to flagging *Eucalyptus* spp., *Casuarina pauper* and *Brachychiton gregorii* habitat trees prior to clearing and then coordinating with the road building contractors to ensure that the road alignment avoids impacting the identified trees.

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

Methodology Crescent Gold (2009)
MBS Environmental (2009)

(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

Western Botanical conducted a flora and vegetation survey of the proposed clearing area and this survey was followed by a targeted flora survey conducted by Goldfields Landcare Services in September 2009. The Western Botanical (2008) flora and vegetation survey included a database search conducted by the Department of Environment and Conservation for Declared Rare Flora (DRF), Priority flora and Threatened Ecological Communities that could potentially occur in the area. In addition, a field survey of the application area was conducted from 24 to 26 July 2007 (Western Botanical, 2008). The flora and vegetation survey identified the following conservation significant flora species within the application area (Western Botanical, 2008):

- *Bossiaea eremaea* (Priority 3);
- *Melaleuca apostiba* (Priority 3);
- *Olearia arida* (Priority 2); and
- *Phyllanthus baeckeoides* (Priority 3).

Western Botanical (2008) reported that approximately 30 individual stems of *Bossiaea eremaea* will be impacted by the proposed clearing. Goldfields Landcare Services (2009) reports that this represents approximately 1% to 1.5% of the entire population in the area. Given this, the proposed removal of these 30 specimens is unlikely to affect the conservation status of this species.

Western Botanical (2008) reports that two individuals of *Melaleuca apostiba* will be impacted by the proposed clearing. It is unknown how many plants occur within the area, however, according to the Western Australian Herbarium (1998 – 2009) there are six other known populations of this species within the Eastern Goldfields region with some of the populations containing over 30 plants (Western Australian Herbarium, 1998 – 2009). Based on this, the removal of two *Melaleuca apostiba* plants is unlikely to affect the conservation status of this species.

Western Botanical (2008) recorded two specimens of *Olearia arida* during the July flora and vegetation survey. Goldfields Landcare Services (2009) conducted a targeted search for *Olearia arida* in September to determine population size. The search conducted by Goldfields Landcare Services (2009) did not record any occurrences of *Olearia arida*, including where previously recorded by Western Botanical. Goldfields Landcare Services (2009) then increased the search area to a 50 metre radius around the site where this species was previously found. No specimens were recorded during this search. Therefore, it is unlikely that the proposed clearing will have any impact on this species.

Western Botanical (2008) reports that 307 individuals of *Phyllanthus baeckeoides* will be impacted by the proposed clearing. The population size in the area is estimated to consist of approximately 1,500 plants (Western Botanical, 2008). Western Botanical (2008) reports that this species is known by the Western Australian Herbarium (1998 – 2009) from nine populations. In addition, two populations were recorded during the flora and vegetation survey and a separate survey undertaken by Western Botanical located another

population near Leinster of approximately 400 plants (Western Botanical, 2008). Based on the number of plants to be impacted by the proposed clearing in comparison to the size of the population, the proposed clearing is not likely to impact on the conservation status of this species.

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

Methodology Goldfields Landcare Services (2009)
Western Australian Herbarium (1998 ? 2009)
Western Botanical (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 (TECs) or Priority Ecological Communities (PECs) within the area applied to clear (GIS Database). The nearest known PEC is located approximately 30 kilometres west of the application area (GIS Database).

Western Botanical (2008) reports that no TECs or PECs were identified during the flora and vegetation survey of the application area.

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

Methodology Western Botanical (2008)
GIS Database
- Threatened Ecological Communities

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

Comments Proposal is not at variance to this Principle

The application area falls within the Great Victoria Desert and Murchison Interim Biogeographic Regionalisation of Australia (IBRA) bioregions (GIS Database). Shepherd (2007) reports that approximately 100% of the pre-European vegetation still exists within these bioregions (see table below). The vegetation within the application area is recorded as the following Beard Vegetation Associations (Shepherd, 2007):

- Beard Vegetation Association 18: Low woodland; mulga (*Acacia aneura*);
- Beard Vegetation Association 389: succulent steppe with open low woodland; Mulga over saltbush;
- Beard Vegetation Association 1239: Hummock grasslands; open medium tree and Mallee steppe; Marble Gum and Mallee (*Eucalyptus youngiana*) over hard Spinifex *Triodia basedowii* on sandplain.

According to Shepherd (2007) approximately 100% of these vegetation associations remain within the bioregions (see table below).

Therefore, the vegetation within the application area is not a significant remnant of native vegetation within 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 - Great Victoria Desert	21,794,205	21,784,757	~99.9	Least Concern	~8.5
IBRA Bioregion - Murchison	28,120,590	28,120,590	~100	Least Concern	~1.06
Beard vegetation associations - State					
18	19,892,305	19,890,195	~100	Least Concern	~2.1
389	622,461	622,461	~100	Least Concern	~0.3
1239	2,234,315	2,234,315	~100	Least Concern	~11.9
Beard vegetation associations - Bioregion Great Victoria Desert					
18	1,954,625	1,964,625	~100	Least Concern	~9.2
389	147,692	147,692	~100	Least Concern	
1239	2,233,685	2,233,685	~100	Least Concern	~11.8
Beard vegetation associations - Bioregion Murchison					
18	12,403,172	12,403,172	~100	Least Concern	~0.4
389	474,082	474,082	~100	Least Concern	~0.4
1239	558	558	~100	Least Concern	~41.1

* Shepherd (2007)

** 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 the Environment (2002)
Shepherd (2007)
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

According to available databases there are numerous ephemeral drainage lines that intersect the application area (GIS Database). Western Botanical (2008) reports the following two vegetation communities that occur within the application area as being associated with watercourses:

- **Drainage Tract Mulga Shrubland (DRMS)**
DRMS was restricted to flat areas / groves associated with drainage lines covering 0.78 kilometres or 1.37%. Vegetation composition is highly variable and largely depends on the vegetation surrounding. The vegetation type appears to have suffered from some degree of pastoral grazing in the past. Dominated by *Acacia aneura* low forest (35% PFC, 5m tall) over a variable shrub layer.
- **Open Drainage Line Shrubland (ODR)**
Vegetation was dominated by scattered *Acacia aneura* over sparse shrubs such as *Eremophila forrestii*, *Ptilotus obovatus* and *Senna cardiosperma*. These areas covering 1.19 kilometres showed impacts of heavy grazing from pastoral activity.

These descriptions indicate that these vegetation units are degraded from previous pastoral activities and photographs supplied by Western Botanical (2008) support this. Crescent Gold (2009) have committed to minimising disturbance to vegetation along drainage courses during construction and to avoid channel modifications.

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

Methodology Crescent Gold (2009)
Western Botanical (2008)
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 may be at variance to this Principle**

The application area has been mapped as occurring within 12 land systems (GIS Database). The following six land systems are the most at risk of land degradation based on land system descriptions by Pringle et al. (1994) and landforms within the application area:

Bevon Land System: Irregular low ironstone hills with stony lower slopes supporting mulga shrublands (Pringle et al., 1994). Minor areas with texture contrast soils on breakaway slopes and narrow drainage tracts are susceptible to soil erosion, particularly if the perennial shrub cover is substantially reduced or the soil surface is disturbed (Pringle et al., 1994). An ephemeral drainage line transects the application area within this land system (GIS Database) and therefore, the clearing of native vegetation may exacerbate soil erosion in this area.

Carnegie Land System: Salt lakes fringing saline flats and dunes (Pringle et al., 1994). Lack of slope renders most of this system generally not susceptible to soil erosion (Pringle et al., 1994). Minor areas receiving concentrated run-on in alluvial plains are susceptible to rilling when shrub cover is substantially reduced or run-on is accelerated due to increased run-off from degraded areas upslope (Pringle et al., 1994). Wind erosion of lake margins may be exacerbated by loss of stabilising perennial shrubs (Pringle et al., 1994).

Jundee Land System: Hardpan plains with ironstone gravel mantles, supporting mulga shrublands (Pringle et al., 1994). Impedance to natural sheet flows can initiate soil erosion and cause water starvation and consequent loss of vigour in vegetation downslope (Pringle et al., 1994). Gravel mantles provide effective protection against soil erosion (Pringle et al., 1994).

Nubev Land System: Gently undulating stony plains; minor limonitic rises and drainage floors, supporting mulga and halophytic shrublands (Pringle et al., 1994). Pringle et al. (1994) report that drainage zones in this land system are moderately susceptible to soil erosion, particularly where perennial shrub cover is substantially reduced or the soil surface is disturbed. Disturbance of the protective stone mantle on saline stony plains is also likely to initiate water erosion (Pringle et al., 1994). An ephemeral drainage line transects the application area within this land system and in addition the application area transects a salt lake area (GIS Database). Therefore, the clearing of native vegetation may exacerbate soil erosion in this area.

Sherwood Land System: Granite breakaways and extensive stony plains with mulga shrublands and minor halophytic shrublands (Pringle et al., 1994). Lower footslopes, alluvial plains and drainage tracts generally have fragile soils which are highly susceptible to water erosion (Pringle et al., 1994). An ephemeral drainage line transects the application area within this land system (GIS Database). Therefore, the clearing of native vegetation may exacerbate soil erosion in this area.

Violet Land System: Undulating stony and gravelly plains and low rises, supporting mulga shrublands (Pringle et al., 1994). Abundant mantles provide effective protection against soil erosion over most of this land system, except where the soil surface has been disturbed, for example by the construction of tracks and gridlines (Pringle et al., 1994). In such circumstances the soil becomes moderately susceptible to water erosion (Pringle et al., 1994). Narrow drainage tracts are mildly susceptible to water erosion, however, no drainage lines transect the application area within this land system (GIS Database).

Soil erosion is likely to be fairly minimal in many sections of the application area due to the low rainfall and gentle topography. The descriptions supplied above indicate that drainage lines have the largest erosion risk (Crescent Gold, 2009). Crescent Gold (2009) have made the following commitments to prevent soil erosion, particularly in areas containing drainage lines:

- clearing and topsoil stripping will not be undertaken during periods of heavy rainfall or high winds;
- erosion at drainage line crossings will be minimised by rock paving in watercourses, use of blanket material where required and rock breaching in the sides of the drainage lines particularly upstream;
- the road design will ensure that rainfall will be contained in the V drains and that V drains have the capacity to contain water associated with dust management; and
- Crescent Gold will minimise disturbance to vegetation along drainage courses during construction and avoid channel modifications.

Based on the above, the proposed clearing may be at variance to this Principle. Should a permit be granted it is recommended that a condition be imposed regarding staged clearing.

Methodology Crescent Gold (2009)
Pringle et al. (1994)
GIS Database

- Hydrography, lakes
- Hydrography, linear
- 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 is not at variance to this Principle

The proposed clearing is not located within any conservation areas (GIS Database). The nearest Department of Environment and Conservation managed land is the Queen Victoria Spring Nature Reserve located approximately 125 kilometres south of the application area (GIS Database).

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

Methodology GIS Database
- DEC Managed Land and Waters

(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

There are no permanent watercourses or wetlands within the application area although there are numerous ephemeral drainage lines (GIS Database).

Rainfall within the region is low and the topography of the application area is primarily flat, however, flash flooding is known to occasionally occur within the Laverton region (Crescent Gold, 2009). Under these flooding conditions runoff and sheet flow could exacerbate soil erosion. Crescent Gold (2009) have committed to the following management mitigation measures to minimise soil erosion and reduce the impacts of runoff on surface water quality:

- clearing and topsoil stripping will not be undertaken during periods of heavy rainfall or high winds;
- The road design will ensure that rainfall will be contained in the V drains and that V drains have the capacity to contain runoff from water associated with dust management;
- erosion at drainage line crossings will be minimised by rock paving in watercourses, use of blanket material where required and rock beaching on the sides of the drainage lines particularly upstream;
- Crescent Gold will check that flow through pipes after a major rainfall event is unrestricted and will remove blockages as necessary; and
- Crescent Gold will minimise disturbance to vegetation along drainage courses during construction and avoid channel modifications.

Crescent Gold (2009) reports that the regional geology of the area is of low permeability. Groundwater occurs in a discontinuous fractured rock aquifer system and the zone of permanent saturation is generally 40 to 50 metres below the ground surface (Crescent Gold, 2009). Given the depth of groundwater, the removal of native vegetation, including deep rooted trees and shrubs, is unlikely to impact on groundwater levels or quality.

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

Methodology Crescent Gold (2009)
GIS Database
- Hydrography, linear

(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

According to available databases numerous ephemeral drainage lines transect the application area and in addition, the application area passes through areas of low-lying salt lakes (GIS Database). The low-lying nature of these areas would make them susceptible to being inundated by water during times of high rainfall and flash flooding. Flash flooding is known to occur occasionally in the Laverton area, however floodwater rapidly rise and disperse (Crescent Gold, 2009).

A pre-existing access track runs parallel to the proposed new road alignment and in addition, many of the vegetation communities within the application area have been degraded by grazing, particularly vegetation associated with drainage lines (Western Botanical, 2008). Furthermore, the total area of clearing to occur within vegetation associated with low-lying salt plains and drainage lines is fairly minimal. Given the degraded nature of the application area and the minimal amount of clearing to occur in low-lying areas, it is unlikely that the proposed clearing would cause or exacerbate the incidence or intensity of flooding in the area.

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

Methodology Crescent Gold (2009)
Western Botanical (2008)
GIS Database
- Hydrography, lakes
- Hydrography, linear

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

Comments

There is one Native Title claim (WC99/001) over the area under application (GIS Database). This claim has been registered with the Native Title Tribunal on behalf of the claimant group. However, the tenements have 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*.

According to available databases there are two Aboriginal Sites of Significance (site ID's 21927 and 3101) 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.

There were no submissions received during the public comments period.

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

4. Assessor's comments

Comment

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

Should the permit be granted it is recommended that conditions be imposed for the purposes of weed management, rehabilitation, staged clearing, record keeping and permit reporting.

5. References

- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002. Department of Conservation and Land Management, Western Australia.
- MBS Environmental (2004) Vegetation and Habitat Assessment of the Euro, Sickle and Admiral Hill Project Areas, Laverton. Martinick Bosch Sell, Western Australia.
- Crescent Gold (2009) Clearing Permit Application Supporting Documentation, November 2009.
- 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.
- Goldfields Landcare Services (2009) Supporting Flora Survey Documentation. Goldfields Landcare Services, Western Australia.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- MBS Environmental (2009) Laverton Gold Project. Level 1 Fauna Survey for Burtville to Fish (M38/073, M38/260, L38/120 and L38/164) and Burtville to Barrick Granny Smith (L38/165) Haul Roads. Martinick Bosch Sell Pty Ltd, Western Australia.
- Pringle, H., Van Vreeswyk, A. and Gilligan, S. (1994) An Inventory and condition survey of the north-eastern Goldfields, Western Australia. Technical Bulletin 87. Department of Agriculture, Western Australia.
- Shepherd, D.P. (2007) 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. Includes subsequent updates for 2006 from Vegetation Extent dataset ANZWA1050000124.
- Western Australian Herbarium (1998 - 2009) Florabase - The Western Australian Flora. Department of Environment and Conservation. Available online from: <http://florabase.dec.wa.gov.au>. Accessed 26 November 2009.
- Western Botanical (2008) Flora and Vegetation of the Proposed Fish Haul Road Alignment. Western Botanical, 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.
DMP	Department of Mines and Petroleum, 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.