



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 4747/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Saracen Gold Mines Pty Ltd

1.3. Property details

Property: Miscellaneous Licence 28/42
Local Government Area: City of Kalgoorlie-Boulder
Colloquial name: Carosue Dam Airstrip

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
100		Mechanical Removal	Airstrip and Associated Infrastructure

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 19 January 2012

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description Beard vegetation associations have been mapped for the whole of Western Australia and are useful to look at vegetation in a regional context. The following Beard vegetation association is located within the application area (GIS Database):

20: Low woodland; mulga mixed with *Allocasuarina cristata* and *Eucalyptus* sp.

Two flora and vegetation surveys have been conducted in the application area. Alexander Holm and Associates (Holm) surveyed most of the application area (264 hectares) between 3 to 5 November 2010 as part of an environmental assessment of the clearing permit application. Mattiske Consulting Pty Ltd (Mattiske) conducted a survey along the Carosue Dam access road which traverses the southern portion of the application area. This survey was conducted for a proposed infrastructure corridor project as part of a joint venture between AngloGold Ashanti and Saracen Gold Mines Pty Ltd and was undertaken on 19 and 23 October 2009 and between 2 to 4 November 2009. A small strip along the southern boundary of the application area has not been surveyed as the Mattiske survey did not extend to the full southern extent of the application area.

Holm (2011) identified five land units and associated sub-units in the application area and described the vegetation in each as follows:

1. Land unit 6 (Sand sheets):

Moderately close to closed tall shrublands dominated by *Acacia effusifolia* with *Enekbatus cryptandroides*, and *Phebalium canaliculatum* dominant in the lower layers but also numerous other shrubs including *Eremophila eriocalyx*, *Leptospermum roei*, *Prostanthera grylloana*, *P. althoferi* ssp. *althoferi*, *Baeckia* sp. Comet Vale and *Homalocalyx thryptomenoides*, occasionally with emergent *Acacia causaneura* trees or *Eucalyptus leptopoda* ssp. *leptopoda* or *E. aff. concinna* mallees. (Sandplain acacia shrublands (SACS)).

2. Land unit 7b (Loamy plains with acacia – mallee – casuarina shrublands/woodlands):

a) Moderately close to closed tall shrublands dominated by *Acacia caesaneura* and *A. ramulosa*; other common shrubs are *Acacia effusifolia*, *Enekbatus cryptandroides*, *Prostanthera althoferi* spp. *althoferi*, *Eremophila eriocalyx*, *E. metallicorum* and *Phebalium canaliculatum*. (Mulga wanderrie grassy shrublands (MUWA)).

b) Moderately close to closed mallee woodlands of *Eucalyptus oleosa* and *E. cylindrocarpa* with prominent shrub layers commonly *Eremophila ionantha*, *Senna artemisioides* ssp. *petiolaris*, *Acacia hemiteles*, *A. colletioides*, *A. burkittii*, *Exocarpus aphyllus* and *Scaevola spinescens*. (Calcareous plain eucalypt mallee/acacia woodlands/shrublands (CEAS)). Occasionally mallees are absent and formation is a shrubland dominated by *Acacia hemiteles* with other shrubs as above. (SACS).

c) Moderately close to closed woodlands of *Casuarina pauper* with prominent shrub layers dominated by *Acacia hemiteles*, *Senna artemisioides* spp. *petiolaris*, *Scaevola spinescens*, *Eremophila glabra* and *Templetonia egena*. (Calcyphytic casuarina acacia woodlands/shrublands (CCAS)).

3. Land unit 7c (Loamy plains with acacia – mallee – casuarina shrublands/woodlands over spinifex): Mallee woodlands of *Eucalyptus oleosa*, *E. concinna* with shrub layers dominated by *Acacia hemiteles*, common others include *Acacia burkittii*, *A. colletioides*, *Eremophila caperata*, *E. ionantha*, *Senna artemisioides* spp. *petiolaris*, *Westringia rigida* and *Scaevola spinescens* with a prominent ground layer of *Triodia irritans*. (Sandplain mallee spinifex woodland (SAMA)). Less frequently shrublands dominated by *Acacia hemiteles*, *A. effusifolia* and *A. burkittii* with other shrubs and spinifex as above. (Sandplain acacia spinifex hummock grassland/woodland (SAWS)).

4. Land unit 15b (Drainage foci – non halophytic domain): Closed tall shrubland of *Acacia incurvaneura* to about eight metres, only isolated lower shrubs such as *Eremophila metallicorum*, *E. eriocalyx*, *E. decipiens* spp. *decipiens*, *Cryptandra connata* and *Acacia burkittii*. (Drainage tract mulga shrublands (DRMS)).

5. Land unit 15c (Scalded foci): Isolated to very scattered shrubs to about five metres of *Acacia caesaneura* and *A. incurvaneura*; occasional *Acacia burkittii*, *A. ramulosa* ssp. *ramulosa*, *Eremophila metallicorum* and *Melaleuca uncinata*. (Hardpan plain mulga shrublands (HPMS)).

Mattiske (2010) mapped four vegetation communities within the application area described as follows:

1. A8: Low woodland of *Acacia ayersiana* and *Eucalyptus leptopoda* subsp. *subluta* over *Phebalium canaliculatum*, *Acacia effusifolia*, *Phebalium tomentella* and mixed shrubs on red-brown sandy clay soils on flats.
2. E18: Open low woodland of *Eucalyptus moderata*, *Eucalyptus brachycorys*, *Eucalyptus oldfieldii*, *Eucalyptus rigidula* and *Callitris preissii* over *Phebalium canaliculatum*, *Acacia effusifolia*, *Thryptomene urceolaris*, *Aluta aspera* subsp. *aspera*, *Westringia cephalantha* and mixed shrubs over *Triodia irritans* on red-brown sandy soils on slopes and ridges.
3. E19: Low woodland of *Eucalyptus brachycorys* and *Eucalyptus eremicola* over *Acacia oswaldii* and *Acacia ayersiana* over *Senna artemisioides* subsp. *filifolia*, *Acacia hemiteles*, *Westringia rigida* and mixed shrubs on red-brown clay soils on flats.
4. E20: Low woodland of *Eucalyptus brachycorys*, *Eucalyptus concinna*, *Eucalyptus cylindrocarpa* and *Eucalyptus eremicola* over *Eremophila caperata*, *Scaevola spinescens*, *Olearia muelleri*, *Westringia rigida* and mixed shrubs over *Triodia irritans* on red-brown sandy clay soils on flats and mid-slopes.

Clearing Description

Saracen Gold Mines Pty Ltd (Saracen) has applied to clear 100 hectares within an application area of approximately 337 hectares (GIS Database). The application area is located approximately 97 kilometres north east of Kalgoorlie (GIS Database).

The purpose of the application is to construct an airstrip and associated infrastructure including an access road and burrow pit. The proposed airstrip will service Saracen's Carosue Dam, Edjudina and Northern mining operations. Clearing will be by bulldozer and grader. Vegetation and topsoil will be stockpiled for use in rehabilitation.

Vegetation Condition

Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994);

To

Completely Degraded: No longer intact; completely/almost completely without native species (Keighery, 1994).

Comment

Holm (2011) visually estimated vegetation condition using standard rating scales as used for rangeland surveys and described by Pringle *et al.* (2004). The assessing officer determined vegetation condition using Holm's ratings and land use information.

According to Holm (2011), the application area is on unallocated crown land and has not been used for pastoral purposes. Approximately 6.4 hectares has been cleared with gravel extracted for the Carosue Dam access road which traverses the southern portion of the application area (Holm, 2011).

The survey by Holm was completed following dry conditions and annual species were sparse (Holm, 2011). Mattiske (2010) also noted that annual and ephemeral species may be under-represented in the survey.

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 East Murchison subregion of the Murchison Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). This subregion is characterised by internal drainage, and extensive areas of elevated red desert sandplains with minimal dune development (CALM, 2002). The salt-lake systems are associated with the occluded Paleodrainage system (CALM, 2002). The vegetation is dominated by Mulga Woodlands often rich in ephemerals; hummock grasslands, saltbush shrublands and Halosarcia shrublands (CALM, 2002).

The majority of the application area (264 hectares) was surveyed by Holm on 3 to 5 November 2010 as part of an environmental assessment of the clearing permit application. This included a flora and vegetation survey, an assessment of landscape stability and condition, a search for evidence of Malleefowl (*Leipoa ocellata*) and description of land units. Mattiske (2010) surveyed a section extending across the southern portion of the application area along the Carosue Dam access road (traverses southern portion of the application area). This was surveyed on 19 and 23 October 2009 and 2 to 4 November 2009 as part of a larger survey for a proposed infrastructure corridor project (overall length of survey area was approximately 100 kilometres from approximately 40 kilometres north of Kalgoorlie to Carosue Dam mine). A small strip running along the southern boundary of the application area has not been surveyed as the Mattiske survey did not extend to the full southern extent of the application area (Saracen, 2011). The width of this strip is approximately 125 metres from the southern boundary of the Mattiske survey with an area of approximately 40 hectares (Saracen, 2011). Aerial photography indicates the vegetation and landscape within this area is similar to the surveyed areas (GIS Database).

A total of 95 flora species representing 25 families were recorded during the survey by Holm (2011). No declared or non-declared weed species were found during this survey (Holm, 2011). Mattiske (2010) identified five introduced taxa along the proposed infrastructure corridor, however, the geographical coordinates of these are not located within the application area (GIS Database).

Vegetation in the application area is mostly in excellent condition as it is on unallocated crown land and has not been used for pastoral purposes (Holm, 2011). Available databases indicate the area of vacant crown land is approximately 100,000 hectares and is largely undisturbed (GIS Database).

According to Holm (2011), loamy plains with acacia-mallee-casuarina shrublands/woodlands with or without spinifex (land units 7c and 7b) occupy over 75% of the survey area while sandplains over gravel, supporting mixed acacia-eucalypt shrublands/woodlands, occupy the remaining eastern portion. Isolated, densely-vegetated drainage foci (land unit 15b) and large, nearly-bare drainage foci (land unit 15c) occur within the loamy plains. Holm (2011) states vegetation within the survey area is consistent with acacia, casuarina and mallee shrublands/woodlands found throughout the north east Goldfields and is not unusually diverse.

Holm (2011) further classifies vegetation according to the site types described in Pringle et al. (1994). Of the site types recorded, CALM (2002) considers vegetation community Calcyphytic casuarina acacia woodlands/shrublands (CCAS) to be an 'ecosystem at risk'. Holm (2011) states CCAS is widespread in the region and the proposed clearing will have very limited impact on the maintenance of this community.

Four vegetation communities recorded during the Mattiske survey occur within the application area including three different types of low *Eucalyptus* woodland and one type of low *Acacia* woodland. Mattiske (2010) states that the vegetation communities recorded during the survey are broadly consistent with communities previously described as being present in this area of the state.

According to available databases (GIS Database), no Declared Rare Flora (DRF), Priority Flora, Priority Ecological Communities (PEC) or Threatened Ecological Communities (TEC) have been located within the application area. No DRF, Priority Flora or TECs were recorded in the area surveyed by Holm (2011) and Mattiske (2010). No PECs were recorded in the area surveyed by Mattiske (2010). Mattiske (2010) recorded one Priority 2 Flora species, *Thryptomene eremaea*, during the proposed infrastructure corridor survey. The geographical coordinates of this occurrence indicates its location as approximately 2.4 kilometres north east of the application area (GIS Database) and at this distance the Priority flora is unlikely to be impacted.

Holm (2011) provided an overview of fauna habitat, stating that isolated, densely vegetated drainage-foci (land unit 15b) may provide fauna refuge and habitat. Saracen (2011) state that the airstrip will be designed to avoid land unit 15b. No breakaways, rock outcrops, rocky hilltops or salt lakes were identified in the survey area (Holm, 2011). A small portion of the application area along the northern side of the Carosue Dam access road was surveyed by Biologic on 22 to 27 October 2009 as part of a Level 1 fauna survey of a proposed infrastructure corridor project. Biologic identified 12 broad habitat types along the corridor, five of which correlate with the vegetation communities described by Holm (with the possible exception of land unit 15b). These include dense *Acacia aneura* shrubland; *Acacia* shrubland; mallee over spinifex; mallee over mixed shrubs on heavier soils; and mallee, *Acacia* and *Allocasuarina* on loam flats. Biologic (2010) states these habitats are numerous or widespread within the area. The application area is, therefore, unlikely to support a higher level of fauna diversity than the surrounding area.

According to Holm (2011), Malleefowl (Vulnerable; Schedule 1) are known to occur in the area and parts of the survey area appear to provide suitable habitat. However, Holm (2011) did not locate any Malleefowl mounds or other evidence of their presence during the survey. Geographical coordinates of Malleefowl observations along the proposed infrastructure corridor indicates no Malleefowl mounds were found by Biologic in the application area, however, two observations of tracks were found in the north-eastern corner of the application area (area not covered by Holm survey) (GIS Database). The area south of the Carosue Dam access road (approximately 80 hectares) was not surveyed by either Holm or Biologic.

Given vegetation in the application area is found throughout the area and undisturbed vegetation exists nearby, it is unlikely that the application area comprises a higher level of biological diversity than surrounding undisturbed areas.

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

Methodology Biologic (2010)
CALM (2002)
Holm (2011)
Mattiske (2010)
Pringle et al. (1994)
Saracen (2011)
GIS Database:
- IBRA WA (Regions – Sub Regions)
- Mulgabbie 1.4m Orthomosaic – Landgate 2003
- Pastoral Leases
- Threatened and Priority Flora
- 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 may be at variance to this Principle

Holm (2011) conducted a field survey for the majority of the application area (264 hectares) on 3 to 5 November 2010 and included a search for Malleefowl (*Leipoa ocellata*) and provided information on fauna habitat. Biologic surveyed a small area just north of the Carosue Dam access road on 22 to 27 October 2009 as part of a Level 1 fauna survey of a proposed infrastructure corridor project (overall survey length approximately 113 kilometres). This included visually inspecting the corridor and traversing selected areas on foot. According to Biologic (2010), over 51 kilometres was surveyed on foot including representative fauna habitats and habitats deemed suitable for conservation significant species. The area south of the Carosue Dam access road (approximately 80 hectares) was not surveyed by either Holm or Biologic. Aerial photography indicates the vegetation and landscape within this area is similar to the surveyed areas (GIS Database).

Fauna refugia in the region include breakaways, rock outcrops, rocky hilltops, drainage lines, dampland areas adjacent to salt lakes and salt lakes after heavy rainfall (Holm, 2011). However, Holm (2011) did not identify any breakaways, rock outcrops and rocky hilltops in the survey area and notes the survey area is 16 kilometres from the nearest salt lake (Lake Rebecca). Within the survey area isolated, densely vegetated drainage-foci (land unit 15b) may provide fauna refuge and habitat whereas scalded foci (land unit 15c) are depauperate and unlikely to act as fauna refugia (Holm, 2011). One occurrence of land unit 15b (1.6 hectares) was recorded during the survey. This was described as closed tall shrubland of *Acacia* to about eight metres with only isolated lower shrubs. Saracen (2011) state that the airstrip will be designed to avoid land unit 15b.

Biologic (2010) identified 12 broad fauna habitat types along the proposed infrastructure corridor with five correlating with the vegetation communities described by Holm (with the possible exception of land unit 15b). These include dense *Acacia aneura* shrubland; *Acacia* shrubland; mallee over spinifex; mallee over mixed shrubs on heavier soils; and mallee, *Acacia* and *Allocasuarina* on loam flats (Biologic, 2010). Dense *Acacia aneura* shrubland was rated as having a high habitat value by Biologic (2010). Dense vegetation in these five habitat types has the potential to support Malleefowl and several other bird species. In particular, dense acacia thickets provide protection and leaf litter suitable for Malleefowl and Malleefowl mound construction (Biologic, 2010). Mature trees in the mallee habitat types may contain hollows which provide nesting, roosting and breeding opportunities and Mallee over spinifex was also noted as potentially supporting a diverse reptile and mammal assemblage (Biologic, 2010). According to Biologic (2010), the five habitat types listed are numerous or widespread in the area.

The surveys conducted by Holm and Biologic included a search for Malleefowl (Vulnerable; Schedule 1). Holm (2011) did not record any Malleefowl mounds or evidence of Malleefowl in the survey area. Biologic recorded seven observations of Malleefowl tracks with two of these occurring in the north-eastern corner of the application area (Biologic, 2010; GIS Database). Biologic also recorded 12 Malleefowl mounds along the corridor, however none were found within the application area. The closest mounds were located between approximately 2.3 to 2.9 kilometres north east of the application area (Biologic 2010; GIS Database). Two were observed to be extinct/inactive and old leaf litter was observed in one indicating it was used in recent years (five to ten years). As it has not been surveyed, it is not known whether Malleefowl mounds occur in the application area south of the Carosue Dam access road. Biologic (2010) also notes that Carosue employees have reported sightings of Malleefowl and that an active mound was recorded more than one kilometre north of the Carosue Dam access road by an archaeologist surveying the proposed route.

According to Biologic (2010), Malleefowl occur in the Carosue area towards the edge of their known range and are likely to occur in the area in low numbers and may be still declining due to predation pressure and habitat degradation by fire. Malleefowl mounds are significant breeding sites, as mounds may be used repeatedly throughout the life of a breeding pair, may be re-used after many years of inactivity or even used across generations (Biologic, 2010). Based on this and given the application area south of the Carosue Dam access road has not been surveyed, it is possible the unsurveyed portion of the application area contains mounds and, therefore, provides significant habitat for the Malleefowl. Potential impacts to Malleefowl mounds as a result of the proposed clearing may be minimised by the implementation of a fauna management condition.

Biologic (2010) recorded two other conservation significant species during the survey of the proposed

infrastructure corridor including:

- Peregrine Falcon (*Falco peregrinus*) – Schedule 4; and
- Rainbow Bee-eater (*Merops ornatus*) – Marine; Migratory under *EPBC Act*, Schedule 3.

The Peregrine Falcon was observed flying over the proposed infrastructure corridor approximately 29 kilometres south west of the application area and the Rainbow Bee-eater was recorded in eucalypt woodland along the corridor (Biologic, 2010). Biologic (2010) notes that the Rainbow Bee-eater is widespread and that this species and the Peregrine Falcon are unlikely to be dependent on habitats within the corridor. Biologic (2010) recommends disturbances to large-hollow-bearing trees should be avoided to minimise impacts on potential breeding habitat for the Peregrine Falcon.

While not recorded during the survey, Biologic (2010) identified several other conservation significant species that are likely to occur within the proposed infrastructure corridor. However, these species are either aerial species largely independent of terrestrial habitats, nomadic and may range over very large areas or are mobile and able to utilise surrounding vegetation (Biologic, 2010).

Seven woodland bird species noted as being in decline were also recorded during the proposed infrastructure corridor survey. These include the Yellow-plumed Honeyeater (*Lichenostomus ornatus*), Regent Parrot (*Polytelis anthopeplus*), Redthroat (*Pyrrholaemus brunneus*), White-browed Babbler (*Pomatostomus superciliosus*), Chestnut Quail Thrush (*Cinclosoma castanotus*) and Gilbert's Whistler (*Pachycephala inornata*) (Biologic, 2010). According to Biologic (2010), these species have lost considerable areas of habitat throughout the Wheatbelt and adjacent Goldfields as a result of large scale habitat clearance and the removal of mature eucalypt trees. Given similar undisturbed habitat exists in the surrounding area, it is unlikely the application area provides significant habitat for these species.

Given there is potential for Malleefowl mounds in the unsurveyed portion of the application area it is possible vegetation within the application area represents significant habitat for the Malleefowl. Based on this, the proposed clearing may be at variance to this Principle.

Methodology Biologic (2010)
Holm (2011)
Saracen (2011)
GIS Database:
- Mulgabbie 1.4m Orthomosaic – Landgate 2003

(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 records of Declared Rare Flora (DRF) within the application area (GIS Database). The nearest record of DRF is located approximately 95 kilometres east of the application area (GIS Database).

No DRF was recorded during the vegetation surveys undertaken by Holm (2011) on 3 to 5 November 2010 and by Mattiske (2010) on 19 and 23 October 2009 and 2 to 4 November 2009.

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

Methodology Holm (2011)
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

According to available databases, there are no known Threatened Ecological Communities (TECs) within the application area (GIS Database).

The buffer of the nearest recorded TEC, Depot Springs stygofauna community, is located approximately 310 kilometres north west of the application area (GIS Database).

No TECs were recorded during the vegetation surveys undertaken by Holm (2011) on 3 to 5 November 2010 and by Mattiske (2010) on 19 and 23 October 2009 and 2 to 4 November 2009.

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

Methodology Holm (2011)
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 application area falls within the Murchison Biogeographic Regionalisation of Australia (IBRA) bioregion in which approximately 100% of the pre-European vegetation remains (see table) (GIS Database; Shepherd, 2009).

The vegetation of the application area has been mapped as the following Beard vegetation association (GIS Database):

20: Low woodland; mulga mixed with *Allocasuarina cristata* and *Eucalyptus* sp.

According to Shepherd (2009), approximately 100% of this Beard vegetation association remains at both a state and bioregional level. Therefore, the area proposed to be cleared does not represent 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 – Murchison	28,120,587	28,120,587	~100	Least Concern	1.06
Beard veg assoc. – State					
20	1,295,103	1,295,103	~100	Least Concern	13.3
Beard veg assoc. – Bioregion					
20	1,174,259	1,174,259	~100	Least Concern	8.9

* Shepherd (2009)

** Department of Natural Resources and Environment (2002)

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

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

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

Comments Proposal is at variance to this Principle

There are two minor, non-perennial watercourses within the application area (GIS Database). These converge in the application area and drain in a southerly to south westerly direction and appear to drain into the surrounding landscape (GIS Database). An area of inundation is located approximately 1 kilometre south of the application area (GIS Database). There are numerous non-perennial watercourses in the vicinity of the application area, several of which drain into areas of inundation (GIS Database).

According to Holm (2011), the landscape is internally drained and drainage is via overland flow to isolated drainage foci (land units 15b and 15c). Holm (2011) describes land unit 15b as densely vegetated drainage sink areas roughly circular to about 100 metres in diameter, sandy clay loam or clay loam red earth soils. Land unit 15c is depauperate and is described as flat apparent sink areas up to 120 metres in extent, clay loam soils with hard scalded surfaces (Holm, 2011). Vegetation is described as closed tall shrubland of *Acacia* to about eight metres with only isolated lower shrubs (land unit 15b) and isolated to very scattered shrubs to about five metres of *Acacia* (land unit 15c). Holm (2011) also classified vegetation as drainage tract mulga shrublands (DRMS) (land unit 15b) and hardpan plain mulga shrublands (HPMS) (land unit 15c). Land unit mapping shows there is one occurrence of land unit 15b (1.6 hectares) and two occurrences of land unit 15c (1.8 hectares) within the area surveyed by Holm.

The Mattiske survey did not provide detail on drainage along the Carosue Dam access road (Mattiske, 2010). Available databases (GIS Database) show there are no watercourses outside of the area surveyed by Holm.

Saracen (2011) states it will design the airstrip to avoid drainage foci (land unit 15b). Where impact to drainage lines are unavoidable the Surface Water Management Plan will be implemented to avoid ponding and diversion

drains constructed to ensure runoff does not cause erosion and diverted water is redirected to the natural drainage system (Saracen, 2011).

Based on the above, the proposed clearing is at variance to this Principle. However, given the management measures that will be put in place by Saracen it is unlikely that the proposed clearing will result in significant impact to watercourses within the application area.

Methodology Holm (2011)
Mattiske (2010)
Saracen (2011)
GIS Database:
- Hydrography, linear
- Rivers

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

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

The application area has been mapped as occurring on the Kirgella land system (GIS Database). The Kirgella land system is described as extensive sandplain, with scattered granite outcrop and fringing drainage foci and very sparse drainage tracts, supporting mainly spinifex hummock grasslands and mulga and mallee shrublands (Pringle et al., 1994). Pringle et al. (1994) did not identify soil erosion as a land management issue in the Kirgella land system.

According to Holm (2011), the survey area consists of extensive, gently undulating sandplains and loamy plains with deep earthy red sand, calcareous red earth and red earth soils which are generally not susceptible to soil erosion. No soil erosion was observed during the field survey and Holm (2011) classified each land unit as having a low vulnerability to erosion. Topography in the application area ranges from level to very gently inclined slopes (up to 2%) (Holm, 2011). Based on the low susceptibility to erosion and the gentle topography of the application area, the proposed clearing is unlikely to lead to appreciable soil erosion.

The average annual evaporation rate is over 10 times the average annual rainfall, so recharge to the groundwater would be expected to be minimal, thereby reducing the likelihood of raised saline water tables occurring as a result of the proposed clearing (BoM, 2012; GIS Database).

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

Methodology BoM (2012)
Holm (2011)
Pringle et al. (1994)
GIS Database:
- Evaporation Isopleths
- 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 likely to be at variance to this Principle

The application area does not lie within any conservation areas or Department of Environment and Conservation (DEC) managed lands (GIS Database). The nearest conservation reserve is the Bullock Holes Timber Reserve, located approximately 50 kilometres south west of the application area (GIS Database). Based on the distance between the application area and the timber reserve, the proposed clearing is not likely to impact the environmental values of any conservation area.

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

Methodology 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

According to available databases, the application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database). There are no permanent waterbodies or watercourses within the application area, however, there are two minor non perennial watercourses within the application area (GIS Database). These converge in the application area and drain in a southerly to south westerly direction and appear to drain into the surrounding landscape (GIS Database). According to Holm (2011), the landscape is internally drained with runoff draining to isolated drainage foci (land units 15b and 15c).

The annual average rainfall for Kalgoorlie-Boulder Airport is 265.2 millimetres and the average annual

evaporation rate for the application area is approximately 2,900 millimetres (BoM, 2012; GIS Database). Therefore, during normal rainfall events surface water within the application area is likely to evaporate quickly. However, substantial rainfall events create surface sheet flow which is likely to have a higher level of sediments. During normal rainfall events, the proposed clearing would not likely lead to an increase in sedimentation of watercourses within the application area.

According to available databases, groundwater salinity within the application area is between 14,000 and 35,000 milligrams/Litre Total Dissolved Solids (TDS) (GIS Database). This is considered to be saline. A groundwater bore located at the south western boundary of the application area has recorded a groundwater depth of 20 metres below ground level (mbgl) with the main aquifer in this bore occurring at 29 to 35 mbgl (Saracen, 2011). Given the high TDS and depth to groundwater, the proposed clearing is not likely to cause salinity levels within the application area to alter.

Saracen (2011) states it will design the airstrip to avoid drainage foci (land unit 15b). Where impact to drainage lines are unavoidable the Surface Water Management Plan will be implemented to avoid ponding and diversion drains constructed to ensure runoff does not cause erosion and diverted water is redirected to the natural drainage system (Saracen, 2011).

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

Methodology BoM (2012)
Holm (2011)
Saracen (2011)
GIS Database:
- Evaporation Isopleths
- Groundwater Salinity, Statewide
- 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 within the Raeside-Ponton catchment area (GIS Database). Given the size of the area to be cleared (100 hectares) in relation to the size of the catchment area (11,589,533 hectares) (GIS Database), the proposed clearing is not likely to increase the potential of flooding on a local or catchment scale.

With an average annual rainfall of 265.2 millimetres and an average evaporation rate of approximately 2,900 millimetres there is likely to be little surface flow during normal seasonal rains (BoM, 2012; GIS Database). Given the likelihood of little surface flow, the proposed clearing is not likely to cause or increase the incidence or intensity of flooding.

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

Methodology BoM (2012)
GIS Database:
- Evaporation Isopleths
- Hydrographic Catchments - Catchments

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

Comments

There is one native title claim over the area under application: WC10/14 (GIS Database). This claim has been filed at the federal court. 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*.

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

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

The clearing permit application was advertised on 19 December 2011 by the Department of Mines and Petroleum inviting submissions from the public. There were no submissions received.

Methodology GIS Database:
- Aboriginal Sites of Significance

4. References

- Alexander Holm & Associates Natural Resource Management Services (2011) Environmental Assessment: Proposed Airstrip for Saracen Gold Mines. Unpublished report for Saracen Gold Mines Pty Ltd dated January 2011.
- Biologic (2010) Level 1 Survey for a Proposed Pipeline from GGT to Carosue Dam and Power line from Black Swan to Carosue Dam, Tropicana JV and Saracen Gold Mines Pty Ltd. Unpublished report for Saracen Gold Mines Pty Ltd dated 18 January 2010.
- BoM (2012) Climate Statistics for Australian Locations. A Search for Climate Statistics for Kalgoorlie-Boulder Airport, Australian Government Bureau of Meteorology, viewed 16 January 2012, <http://www.bom.gov.au/climate/averages/tables/cw_012038.shtml>.
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions. Murchison 1 (MUR1 - East Murchison subregion) Department of Conservation and Land Management, 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 Consulting Pty Ltd (2010) Flora and Vegetation Survey of the Infrastructure Corridor GGT / Black Swan Nickel Mine to Carosue Dam Gold Mine. Unpublished report for Tropicana Joint Venture and Saracen Gold Mines Pty Ltd dated January 2010.
- Pringle, H.J.R, Van Vreeswyk, A.M.E. and Gilligan, S.A. (1994) An inventory and condition survey of rangelands in the north-eastern Goldfields, Western Australia, Technical Bulletin No. 87., Department of Agriculture, South Perth, Western Australia.
- Saracen Gold Mines Pty Ltd (2011) Carosue Dam Airstrip Clearing Permit Application. Unpublished report dated 28 November 2011.
- 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.

5. Glossary

Acronyms:

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

Definitions:

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

- P1** **Priority One - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
- P2** **Priority Two - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations, at

least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

- P3 Priority Three - Poorly Known taxa:** taxa which are known from several populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey.
- P4 Priority Four – Rare taxa:** taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5–10 years.
- R Declared Rare Flora – Extant taxa (= Threatened Flora = Endangered + Vulnerable):** taxa which have been adequately searched for, and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.
- X Declared Rare Flora - Presumed Extinct taxa:** taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.

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

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

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

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

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

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

- (a) is not critically endangered or endangered; and
- (b) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.

CD

Conservation Dependent: A native species which is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.