



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 3833/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **Saracen Gold Mines Pty Ltd**

1.3. Property details

Property: Mining Lease 28/166
Mining Lease 28/167
Mining Lease 28/269

Local Government Area: Shire of Kalgoorlie-Boulder
Colloquial name: Karari Stage 3 Project

1.4. Application

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

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 1:250,000 scale for the whole of Western Australia. Two Beard vegetation associations have been mapped within the application area (GIS Database; Shepherd, 2007).

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

24: Low woodland; *Casuarina cristata* (GIS Database; Shepherd, 2007).

The application area was surveyed by Mattiske Consulting Pty Ltd staff on the 14 and 15 April 2010 (Mattiske Consulting Pty Ltd, 2010). The following vegetation types were identified within the application area;

E1: Low open woodland of *Eucalyptus oleosa* subsp. *oleosa* over an open scrub of *Acacia aneura* var. *intermedia* and *Acacia ayersiana* with occasional *Casuarina pauper* over low to open low shrubland of *Acacia burkittii*, *Acacia ramulosa* var. *ramulosa*, *Dodonaea lobulata*, *Senna artemisioides* subsp. *filifolia*, *Ptilotus obovatus*, *Maireana sedifolia* and *Maireana georgei* on red clay loam flats and minor drainage areas;

E2: Woodland to open woodland of *Eucalyptus salmonophloia* occasionally with *Eucalyptus lesouefii* and *Eucalyptus concinna* over low shrubland to open low shrubland of *Eremophila scoparia*, *Senna artemisioides* subsp. *filifolia*, *Acacia hemiteles*, *Atriplex vesicaria*, *Atriplex nummularia*, *Dodonaea lobulata*, *Maireana sedifolia* and *Maireana triptera* on shallow calcrete red/brown clay loams often with a fine calcrete or ironstone mantle;

E3: Low open woodland of *Eucalyptus oleosa* subsp. *oleosa* over scrub of *Acacia aneura* var. *intermedia*, *Acacia ayersiana* and *Grevillea nematophylla* over an open low shrubland of *Acacia burkittii*, *Acacia tetragonophylla*, *Acacia ramulosa* var. *ramulosa*, *Scaevola spinescens* *Dodonaea lobulata*, *Dodonaea rigida*, *Spartothamnella teucriflora*, *Senna artemisioides* subsp. *filifolia* and *Ptilotus obovatus* on red clay loam flats and wash plains, with a mantle of ironstone and calcrete pebbles;

C1: Open low woodland of *Casuarina pauper* over an open low shrubland of *Scaevola spinescens*, *Acacia nyssophylla*, *Eremophila scoparia*, *Eremophila glabra*, *Dodonaea lobulata*, *Eremophila oldfieldii* subsp. *angustifolia*, *Senna artemisioides* subsp. *filifolia* on slopes and flats in shallow red/brown clay loams on calcrete often with rocky calcrete, ironstone and quartz mantles;

C2: Open low woodland of *Casuarina pauper* with occasional *Acacia* and *Eucalyptus* species over an open low shrubland of *Olearia muelleri*, *Ptilotus obovatus* and *Senna artemisioides* subsp. *filifolia* on rocky calcrete rises with red/brown clay loam;

C3: Open low woodland of *Casuarina pauper* and occasionally *Eucalyptus concinna* over a scrub of *Acacia ayersiana*, *Acacia aneura* var. *intermedia* and *Grevillea nematophylla* over an open low shrubland of *Scaevola spinescens*, *Dodonaea rigida*, *Senna artemisioides* subsp. *filifolia*, *Acacia kempeana* and *Ptilotus obovatus* on red clay loam on flats often with a fine ironstone mantle;

S1: Scrub of *Acacia ayersiana* and *Grevillea nematophylla* with occasional *Casuarina pauper* and *Eucalyptus* species over a low to open low shrubland of *Acacia tetragonophylla*, *Senna artemisioides* subsp. *filifolia*, *Ptilotus obovatus*, *Dodonaea rigida* and *Scaevola spinescens* on red clay loam flats;

A1: Closed scrub of *Acacia aneura* var. *intermedia* to open scrub of *Acacia burkittii* and *Acacia tetragonophylla* over open low shrubland of *Eremophila oldfieldii* subsp. *angustifolia*, *Eremophila glabra*, and *Dodonaea lobulata* on red/brown clay loams and sandy loams in drainage lines and areas; and

A2: Scrub of *Acacia aneura* var. *intermedia*, *Acacia ayersiana* and *Grevillea nematophylla* with emergent *Eucalyptus oleosa* subsp. *oleosa* and *Casuarina pauper* over a low shrubland of *Acacia burkittii*, *Acacia tetragonophylla*, *Acacia ramulosa* var. *ramulosa*, *Scaevola spinescens*, *Dodonaea lobulata*, *Dodonaea rigida*, *Spartothamnella teucriflora* and *Ptilotus obovatus* on red clay loam flats and wash plains sometimes with a mantle of ironstone and calcrete pebbles (Mattiske Consulting Pty Ltd, 2010).

Clearing Description	The Karari Stage 3 Project forms part of Saracen Gold Mines Pty Ltd Carosue Dam Operations (Saracen Gold Mines Pty Ltd, 2010). The Karari open pit is located 1 kilometre south-east of the Carosue Dam Operations processing plant and approximately 2 kilometres south of the Whirling Dervish open pit (Saracen Gold Mines Pty Ltd, 2010). Saracen Gold Mines Pty Ltd (2010) is applying to clear up to 150 hectares of native vegetation within an area of approximately 290 hectares to develop the Karari Stage 3 Project, which includes a cutback of the existing open pit, waste rock landforms, roads and a go-bay. The Karari Stage 3 Project will be supported by existing infrastructure such as run of mine (ROM) pads, workshops and offices located at the Carosue Dam Operations site (Saracen Gold Mines Pty Ltd, 2010).
Vegetation Condition	Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery, 1994); To Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994).
Comment	The application area is located in the Eastern Goldfields region, approximately 85 kilometres north-east of Kanowna (GIS Database). The vegetation condition was derived from a vegetation survey conducted by Mattiske Consulting Pty Ltd (2010).

3. Assessment of application against clearing principles

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

Comments	<p>Proposal is not likely to be at variance to this Principle</p> <p>The application area occurs within the East Murchison (MUR1) 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 sand plains with minimal dune development (CALM, 2002). It contains salt-lake systems associated with the occluded Paleodrainage system (CALM, 2002). This subregion has broad plains of red-brown soils and breakaway complexes as well as red sand plains (CALM, 2002). The vegetation is dominated by Mulga woodlands often rich in ephemerals, hummock grasslands, saltbush shrublands and Halosarcia shrublands (CALM, 2002).</p> <p>The vegetation within the application area consists of Beard vegetation associations 20 and 24 which are common and widespread throughout the Goldfields region, with approximately 100% of the pre-European vegetation extent remaining (Shepherd, 2007; GIS Database). Mattiske Consulting Pty Ltd (2010) recorded 69 vascular plant taxa from 31 genera and 19 families during the vegetation survey of the application area. No Declared Rare Flora, Priority flora or introduced flora species were recorded within the application area (Mattiske Consulting Pty Ltd, 2010).</p> <p>Four fauna habitats were identified within the application area:</p> <ol style="list-style-type: none">1. <i>Acacia</i> (mulga) Shrubland on clay soils - this contains dense stands of <i>Acacia aneura</i> shrubs and was the dominant habitat on site;2. <i>Acacia</i> Shrubland on rocky soils - this contains <i>Acacia</i> shrubs and predominantly contains a gravelly or rocky understorey;3. <i>Eucalyptus</i> Woodland - this contains mixed <i>Eucalyptus</i> trees including mallees and includes mixed shrublands. Larger <i>Eucalyptus</i> trees were located towards the southern edge of the eastern side of the project area and also in the south eastern section; and4. Drainage Lines - this habitat is fairly typical in the Goldfields and contains eucalypt trees and shrubs and water after significant rainfall events (Coffey Environments, 2010). <p>The fauna habitats recorded during the survey were assessed as being in good condition although previous anthropogenic activities, such as grazing, mineral exploration and tree clearing, has degraded some areas of the site (Coffey Environments, 2010). The habitats were considered to be typical to those found in the vicinity of the application area.</p>
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The Karari open pit is located 1 kilometre south-east of the Carosue Dam Operation processing plant and approximately 2 kilometres south of the Whirling Dervish open pit. The application area has suffered previous disturbance and is classed as degraded in some areas.

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

Methodology CALM (2002)
Coffey Environments (2010)
Mattiske Consulting Pty Ltd (2010)
Shepherd (2007)
GIS Database
- IBRA WA (regions - subregions)
- Pre-European vegetation

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

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

According to Shepherd (2007) approximately 100% of the pre-European vegetation remains within the Murchison bioregion. Given the extent of native vegetation remaining in the local area and bioregion, the vegetation to be cleared does not represent a significant ecological linkage.

In 2010, a Level 1 (EPA 2004) fauna survey of the Carosue Dam Project area within mining tenements M28/166 and M28/167 was undertaken by Coffey Environments (2010). The field survey was conducted on 10-11 May 2010, with the site being traversed by vehicle and on foot (Coffey Environments, 2010).

Coffey Environments (2010) recorded four broad habitat types as occurring within the application area:

1. *Acacia* (mulga) Shrubland on clay soils - this contains dense stands of *Acacia aneura* shrubs and was the dominant habitat on site;
2. *Acacia* Shrubland on rocky soils - this contains *Acacia* shrubs and predominantly contains a gravelly or rocky understorey;
3. *Eucalyptus* Woodland - this contains mixed *Eucalyptus* trees including mallees and includes mixed shrublands. Larger *Eucalyptus* trees were located towards the southern edge of the eastern side of the project area and also in the south eastern section; and
4. Drainage Lines - this habitat is fairly typical in the Goldfields and contains eucalypt trees and shrubs and water after significant rainfall events (Coffey Environments, 2010).

The majority of the survey area was *Acacia* shrubland on clay soils. A major drainage line traverses the centre of the project area and includes a number of larger eucalypt trees which should be retained where possible (Coffey Environments, 2010).

The fauna habitats within the survey area were assessed as being good quality with some impact as a result of previous pastoral activity and mineral exploration activities. Good fauna habitat is described as areas which showed signs of disturbance but generally retained many of the characteristics of the habitat if it had not been disturbed. Good fauna habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be affected by any disturbance (Coffey Environments, 2010).

Three ancient Malleefowl mounds were located during the survey or had been recorded during other biological assessments conducted within the application area; however no additional mounds that were considered to provide the potential for Malleefowl nesting were located during the survey (Coffey Environments, 2010). Malleefowl are expected to occur within the region and are likely to be recorded occasionally within the application area however, it is likely that Malleefowl will pass through the area but not utilise the available habitat for nest construction (Coffey Environments, 2010).

The habitats recorded during the survey are considered to be typical to those found in the Goldfields region. Although the clearing of vegetation and mining development will inevitably result in the loss of a number of individuals at a local scale, clearing of vegetation within the application area will have a low risk of significantly impacting on:

- The biodiversity value at the genetic, species, and ecosystem levels in a regional context;
- Terrestrial fauna in a regional context;
- Species of conservation significance;
- An ecosystem of high functional value; and
- An ecosystem that is important in a regional context (Coffey Environments, 2010; Saracen Gold Mines Pty Ltd, 2010).

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

Methodology Coffey Environments (2010)
EPA (2004)

Saracen Gold Mines Pty Ltd (2010)
Shepherd (2007)

(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 GIS databases there are no known records of Declared Rare Flora (DRF) within the application area (GIS Database).

A flora survey was conducted over the application area by staff from Mattiske Consulting Pty Ltd on 14-15 April 2010 (Mattiske Consulting Pty Ltd, 2010). No DRF or Priority flora species were recorded within the survey area (Mattiske Consulting Pty Ltd, 2010).

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

Methodology Mattiske Consulting Pty Ltd (2010)
GIS Database
- Declared Rare and Priority Flora List

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

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

A search of available databases reveals that there are no Threatened Ecological Communities (TECs) within the application area (GIS Database). The nearest TEC is located approximately 311 kilometres north-west of the application area (Depot Springs Stygofauna Community) (DEC, 2006). At this distance there is little likelihood of any impact to the TEC from the proposed clearing.

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

Methodology DEC (2006)
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 falls within the Murchison IBRA bioregion (GIS Database). Shepherd (2007) reports that approximately 100% of the pre-European vegetation remains in this bioregion.

The vegetation within the application area is recorded as Beard vegetation associations:

20: Low woodland; mulga mixed with *Casuarina cristata* & *Eucalyptus* sp.; and
24: Low woodland; *Casuarina cristata* (GIS Database; Shepherd, 2007).

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

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion - Murchison	28,120,590	28,120,590	~100%	Least Concern	~1.06%
IBRA Subregion - Eastern Murchison	21,135,084	21,135,084	~100%	Least Concern	~1.39%
Beard vegetation associations - State					
20	1,295,103	1,295,103	~100%	Least Concern	~13.3%
24	263,148	263,148	~100%	Least Concern	~0.3%
Beard vegetation associations - Bioregion					
20	1,174,259	1,174,259	~100%	Least Concern	~8.9%
24	22,163	22,163	~100%	Least Concern	~1.3%

* 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 Environment (2002)
Shepherd (2007)
GIS Database
- IBRA WA (regions - subregions)
- Pre-European Vegetation

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

Comments Proposal is at variance to this Principle

According to available GIS Databases, there are no permanent wetlands or watercourses within the application area, however Lake Rebecca is located approximately 10.5 kilometres north-east of the application area (GIS Database).

Based on vegetation mapping conducted by Mattiske Consulting Pty Ltd (2010) four of the nine vegetation associations found within the application area are associated with some minor drainage and sheet flow areas. No major watercourses or wetlands were recorded in the survey area (Saracen Gold Mines Pty Ltd, 2010).

E1: This vegetation community was found on red clay loam flats and minor drainage areas;

E3: This vegetation community was found on red clay loam flats and wash plains, with a mantle of ironstone and calcrete pebbles;

A1: This vegetation community was found on red/brown clay loams and sandy loams in drainage lines and areas; and

A2: This vegetation community was found on red clay loam flats and wash plains sometimes with a mantle of ironstone and calcrete pebbles (Mattiske Consulting Pty Ltd, 2010).

Based on the above, the proposed clearing is at variance to this Principle. Saracen Gold Mines Pty Ltd (2010) have advised that they do not intend to clear within the broad drainage line between the Karari pit extension area and the proposed air strip clearing area, while drainage lines to the south have been deliberately excluded from the survey area as Saracen Gold Mines Pty Ltd does not intend to impact these areas.

The smaller drainage lines from the breakaways to the west of the project area will be avoided were possible however a diversion bund is expected to be required to redirect water flowing to the east off the breakaways and foot slopes southward around the proposed waste rock dump and into the existing drainage lines to the south (Saracen Gold Mines Pty Ltd, 2010)

Where impact to existing drainage lines is unavoidable Saracen Gold Mines Pty Ltd (2010) has committed to the following;

- Surface Water Management Plan will be implemented to avoid ponding against waste rock dumps and other project facilities;
- Divert uncontaminated water away from potentially contaminated areas;

- Construct diversion drains to ensure that runoff from rainfall does not cause erosion; and
- Any diverted water is to be redirected to enter the natural drainage system clear of developed areas.

Methodology Mattiske Consulting Pty Ltd (2010)
Saracen Gold Mines Pty Ltd (2010)
GIS Database
- Hydrography, Linear
- Geodata, Lakes

(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 surveyed by the Department of Agriculture and Food (Pringle et al, 1994). The application area is comprised of the following land systems (GIS Database);

- Campsite land system (approximately 0.13%) - alluvial plains supporting eucalypt woodlands with halophytic understoreys and *Acacia* shrublands;
- Deadman land system (approximately 92.44%) - calcareous plains supporting *Acacia*, black oak and mallee shrublands/woodlands adjacent to salt lake systems;
- Kirgella land system (approximately 0.95%) - extensive sandplain, with scattered granite outcrop, supporting mainly spinifex hummock grasslands and mulga and mallee shrublands; and
- Moriarty land system (approximately 6.48%) - low greenstone rises and stony plains, supporting chenopod shrublands with patchy eucalypt overstoreys (Pringle et al, 1994).

The Campsite, Deadman and Kirgella land systems are generally not prone to erosion, while the Moriarty land system is moderately susceptible to erosion (32% susceptibility) (Pringle et al, 1994). The terrain of the application area is generally flat to gently undulating, relatively low lying, while the soils are principally shallow earth loam overlying red-brown hardpans, shallow stony loams on hills and red earthy sands on sand plains (Mattiske Consulting Pty Ltd, 2010; Saracen Gold Mines Pty Ltd, 2010).

Based on the above the proposed clearing may be at variance to this Principle. Potential land degradation impacts as a result of the proposed clearing may be minimised by the implementation of a staged clearing condition.

Methodology Mattiske Consulting Pty Ltd (2010)
Pringle et al. (1994)
Saracen Gold Mines Pty Ltd (2010)
GIS Database
- Rangeland Land System Mapping

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

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

The proposed clearing is not located within a conservation reserve (GIS Database). The nearest known conservation reserve is the Bullock Holes Timber Reserve, located approximately 59 kilometres south-west of the application area (GIS Database).

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).

The groundwater salinity within the application area is approximately 14,000-35,000 milligrams/Litre Total Dissolved Solids (TDS) (GIS Database). Groundwater salinity increases with depth, with field values between 50,000 and 100,000 milligrams/Litre TDS at 50-70 metres depth and 80,000 to 200,000 milligrams/Litre TDS down to 150 metres (Saracen Gold Mines Pty Ltd, 2010). This is considered to be hypersaline. The proposed clearing is not likely to cause salinity levels within the application area to alter significantly.

There are no permanent or semi-permanent water bodies or watercourses within the application area (Saracen Gold Mines Pty Ltd, 2010; GIS Database). Lake Rebecca which lies approximately 10.5 kilometres north-east of

the application area receives surface drainage from the surrounding country and very occasionally fills. Drainage within the application area consists of small ephemeral creeks and drainage lines and in some areas wide drainage flats (Saracen Gold Mines Pty Ltd, 2010).

The application area is located in an arid region, with mainly winter rainfall (CALM, 2002). With an average rainfall of approximately 232.4 millimetres/year and an annual pan evaporation rate of 2,400 millimetres/year (BoM, 2010), there is little surface flow during normal seasonal rains. The proposed clearing is not likely to cause the quality of surface water to deteriorate.

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

Methodology BoM (2010)
CALM (2002)
Saracen Gold Mines Pty Ltd (2010)
GIS Database
- Public Drinking Water Source Areas
- Groundwater Salinity, Statewide
- 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

The application area experiences an arid climate with an average annual rainfall of 232.4 millimetres recorded from the nearest weather station at Kanowna approximately 85 kilometres south-west of the application area (CALM, 2002; BoM, 2010). The application area also experiences a high average annual evaporation rate exceeding the average annual rainfall by more than ten times (approximately 2,400 millimetres) (BoM, 2010). Clearing within the application area is unlikely to exacerbate or increase the incidence or intensity of flooding.

The application area is located within the Raeside-Ponton catchment area (GIS Database). However, the size of the area to be cleared (150 hectares) in relation to the size of the Raeside-Ponton catchment area (11,589,533 hectares) (GIS Database) is not likely to increase the potential for flooding within the application area, local area or within the catchment.

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

Methodology BoM (2010)
CALM (2002)
GIS Database
- Hydrographic Catchments - Catchments

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

Comments

The clearing permit application was advertised on 19 July 2010 by the Department of Mines and Petroleum inviting submissions from the public. One submission was received in relation to this application regarding aboriginal heritage issues. A written response was provided on the matters raised.

There is one Native Title Claim (WC99_001) over the area under application. This claim has been registered with the National 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*.

There are no registered Aboriginal Sites of Significance within the application area (GIS Database). The nearest registered Aboriginal Site of Significance is located approximately 0.1 kilometres east of the application area (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal sites of significance are damaged through the clearing process.

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

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

4. Assessor's comments

Comment

The application has been assessed against the clearing principles, planning instruments and other matters in accordance with s.51O of the *Environmental Protection Act 1986*, and the proposed clearing is at variance to Principle (f), may be at variance to Principle (g), is not likely to be at variance to Principles (a), (b), (c), (d), (h), (i) and (j) and is not at variance to Principle (e).

5. References

- BoM (2010) Bureau of Meteorology Website - Climate Averages by Number, Averages for KANOWNA. http://www.bom.gov.au/climate/averages/tables/cw_012040.shtml (Accessed 18 August 2010).
- 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.
- Coffey Environments (2010) Level 1 Vertebrate Fauna Survey for the Carosue Dam Project, Saracen Gold. Prepared for Saracen Gold Mines Pty Ltd. Unpublished report dated June 2010.
- DEC (2006) List of Threatened Ecological Communities on the Department of Environment and Conservation's Threatened Ecological Community (TEC) Database endorsed by the Minister for the Environment. Species and Communities Branch, Department of Environment and Conservation.
- 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.
- EPA (2004) Guidance for the Assessment of Environmental Factors - Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia. Guidance Statement No 51. Environmental Protection Authority, 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.
- Mattiske Consulting Pty Ltd (2010) Flora and Vegetation Survey of the Karari Pit Extension. Prepared for Saracen Gold Mines Pty Ltd. Unpublished report dated June 2010.
- Pringle, H.J.R., Van Vreeswyk, A.M.E., and Gilligan, S.A. (1994) An Inventory and Condition Survey of the North-Eastern Goldfields, Western Australia, Department of Agriculture, Western Australia.
- Saracen Gold Mines Pty Ltd (2010) Karari - Stage 3. Clearing Permit Application Supporting Documentation. Unpublished report dated July 2010.
- 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.

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.