Department of Industry and Resources

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 1709/1

Permit type: Area Permit

1.2. Proponent details

Proponent's name: **Black Swan Nickel Mine, MPI Nickel Pty Ltd, Lionore Australia**

1.3. Property details

Property: Mining Lease M27/200

Local Government Area: City of Kalgoorlie-Boulder

Colloquial name: Black Swan Nickel Mine

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
19.5		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	Clearing Description	Vegetation Condition	Comment
The vegetation of the application area has been broadly mapped at a scale of 1:250 000 as Beard vegetation association 20: Low woodland; Mulga mixed with *Allocasuarina cristata* and Eucalyptus species. (GIS Database, 2007; Shepherd et al. 2001). A flora survey of the area proposed to be cleared was conducted by Paul Armstrong and Associates in 2006 and vegetation was mapped at a scale of 1:25000 (Paul Armstrong & Associates, 2006). The survey identified three vegetation associations, these were: 1. Mulga Shrubland with Sheoak: Thicket species dominated by *Acacia aneura* and *Casuarina pauper* over Open Low Scrub to Low Scrub species such as *Senna artemisioides*; over Open Dwarf Scrub to Dwarf Scrub dominated by *Eremophlia metallicorum* (Paul Armstrong and Associates, 2006). 2. Salmon gum Woodland: Consisted of Low Woodland dominated by *Eucalyptus salmonophloia*; over Scrub dominated by *Acacia aneura* and *Casuarina pauper*; over Open Low Scrub dominated by *Acacia hemiteles* or *Atriplex nummularia*; over Dwarf Scrub dominated by *Atriplex vesiculara subsp. appendiculata* (Paul Armstrong and Associates, 2006). 3. *Eucalyptus eremicola* Woodland: Low Woodland dominated by *Eucalyptus eremicola subsp. eremicola*; over Open Scrub dominated by *Acacia aneura*; over Open Low Scrub dominated by *Acacia burkittii*; over Dwarf Scrub dominated by *Eremophila metallicorum* (Paul Armstrong and Associates, 2006). Four introduced weed species were recorded from the Black Swan Nickel (BSN) lease area. None of the weed species recorded were classified as a declared plant under the *Agriculture and Related Resources Protection Act 1976* (Paul Armstrong & Associates, 2007).	The proposal is for the clearing of 19.5 hectares of native vegetation for the expansion of the current BSN Tailings Storage Facility (TSF). The proposed clearing area is a narrow strip approximately 120 metres wide, to the south and west of the existing TSF (GIS Database, 2007). Clearing is proposed to commence in June 2007, by Black Swan Nickel Pty Ltd.	Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery 1994)	The BSN operation is located approximately 55 kilometres northeast of Kalgoorlie on the Mt Vetters Pastoral Station. There were some signs of stock grazing and water ponding (Paul Armstrong and Associates, 2006). The vegetation of the site is well represented throughout the region.

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 area proposed to be cleared is largely comprised of Mulga woodland, a dominant vegetation association within the Murchison region (Shepherd et al, 2001). The application site is found within the IBRA East Murchison subregion (GIS Database). None of the rare features, centres of endemism, wetlands of National Significance or Ecosystems at risk are located within or near the application site and therefore will be not impacted upon by the TSF expansion project (Cowan, 2001).

ATA Environmental conducted a fauna survey of the area proposed to be cleared in June 2006 (ATA Environmental 2006). ATA Environmental state in their report that the surrounding fauna habitats outside of the area proposed to be cleared are similar to that found within the area under application. Overall the condition of vegetation within the site was in a very good condition however there were signs of degradation from stock grazing, clearing for vehicle tracks and water ponding in some areas, which has resulted from altered drainage (Paul Armstrong & Associates, 2006). Considering the close proximity of mining infrastructure such as the TSF and vehicle tracks within the vegetation in the application area it is highly unlikely that biodiversity values within the site would be higher than surrounding areas.

A targeted flora survey of the application area and adjacent areas of the BSN lease area was conducted by Paul Armstrong & Associates in December 2006. As a result a total of 88 native plant taxa from 31 families, were recorded from the survey area, there were also four weed species found (Paul Armstrong and Associates, 2006). Species representation was greatest among the *Chenopodiaceae* (14), *Myrtaceae* (10), *Myoporaceae* (8) and *Mimosaceae* (7) families, with these four providing over half of the total species richness recorded within the BSN site. However there were only thirty-two species of flora recorded from the TSF expansion area, no weeds occurred within the application site but adjacent areas were contaminated. Paul Armstrong (2006) states that vegetation was in an Excellent to Very Good condition, but there were some signs of degradation from stock grazing and water ponding.

No Declared Rare or Priority flora species are known to occur within the area under application (GIS Database), and none were recorded during the recent flora survey conducted in December 2006 across the TSF expansion area (Paul Armstrong & Associates, 2006).

No species listed under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*, or the *Wildlife Conservation Act 1950* are likely to be significantly impacted by the proposed clearing of this land (ATA Environmental, 2006). Furthermore, the faunal assemblage that is currently present on the site, and which will be impacted on during clearing, is unlikely to differ from that found in similar habitat located elsewhere in the bioregion (Shepherd et al, 2001).

It is unlikely that the biodiversity at the site of this proposal would be considered outstanding, or of a higher diversity than other areas in the Murchison bioregion or the local area. Previous advice provided by CALM in relation to clearing for a nearby waste rock dump (CPS 912/1) also applies to this proposal. CALM advised that the waste rock dump proposal was unlikely to have any impact on any significant environmental values, and based on the close proximity of both proposals and similar environments, it is unlikely that there will be any significant impacts to the biodiversity values from the TSF expansion (CALM, 2006).

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

Methodology

ATA Environmental (2006).
CALM (2006).
Cowan (2001).
Paul Armstrong and Associates (2006).
Shepherd (2001).
GIS Databases:
-Declared Rare and Priority Flora List - CALM 01/07/05.
-Interim Biogeographic Regionalisation of Australia (subregions) - EA 18/10/00
- Pre-European Vegetation - DA 01/01.

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

Comments

Proposal is not likely to be at variance to this Principle

A fauna assessment comprising of a desktop survey and a site reconnaissance of the area proposed to be cleared was conducted by ATA Environmental on the 6th and 10th of January and 11th of October 2006. ATA Environmental conducted a search of the Western Australian Museum's online database (FaunaBase), CALM's Threatened and Priority fauna database and the Commonwealth Department of Environment and Heritage's *EPBC Act 1999* online database was conducted prior to a reconnaissance survey and grid search of the area under application.

As a result of the Desktop study there were a number of fauna species which were identified as potentially

occurring within the survey area (ATA Environmental, 2007). These include: Carnaby's Cockatoo (*Calyptorhynchus latirostris* - Schedule 1), Red-tailed Phascogale (*Phascogale calura* - Schedule 1), Chuditch (*Dasyurus geoffroii* - Schedule 1), Slender Billed Thornbill (*Acanthiza iredalei iredalei*), Malleefowl (*Leipoa ocellate* - Schedule 1), Numbat (*Myrmecobius fasciatus* - Schedule 1), Great Egret, White Egret (*Ardea alba*), Fork-tailed Swift (*Apus pacificus*), Rainbow Bee-eater (*Merops ornatus*), Carpet Python (*Morelia spilota imbricata* - Schedule 4), *Branchinella denticulata* - Priority 1, *Jalmenus aridus* - Priority 1, *Ogyris subterrestris petrina* - Priority 1, Shy Heathwren (*Hylacola cauta whitlocki*), Western Rosella (*Platycercus icterotis xanthogenys* - Priority 3), Australian Bustard (*Ardeotis australis* - Priority 4), Crested Bellbird (*Oreoica gutturalis gutturalis*), White-browed Babbler (*Pomatostomus superciliosus ashbyi* - Priority 4), Hooded Plover (*Charadrius rubricollis* - Priority 3) and Thick-billed Grass-wren (*Amytornis textilis textilis* - Priority 4).

ATA Environmental (2006) considers the species most likely to occur within the application area are the Rainbow Bee-eater, Carpet Python, Western Rosella and the Australian Bustard.

Of the possible species listed under the *EPBC Act 1999* only the Rainbow Be-eater (*Merops ornatus*) perhaps frequents the Black Swan Nickel lease area and surrounding habitats (ATA Environmental, 2006). This species is listed as a Migratory species and has a relatively wide-spread distribution. Given that the proposed land clearing represents a very small fraction of similar habitat in the general area, it is unlikely to have any significant impact on this species (ATA Environmental, 2006).

The Carpet Python (*Morelia spilota imbricata*) is almost certainly found in the general area; it has been sighted in open woodland areas of the Goldfields and there are known populations 20 kilometres east of the application site (ATA Environmental, 2006). However given that the proposed land clearing represents a very small fraction of similar habitat in the general area, it is highly unlikely to have any significant impact on this species (ATA Environmental, 2006).

The Western Rosella (*Platycercus icterotis xanthogenys*) has been recorded in the vicinity of Kalgoorlie. Its habitat preference is eucalypt and sheoak woodlands and shrublands containing Salmon Gums *E. salmonophloia* (Massam & Chapman, 2005). Shrublands containing Salmon Gums (approximately 9 hectares) occur in the southern portion of the application area, however given that the proposed clearing represents a very small fraction of similar habitat in the area, it is unlikely to have any significant impact on this species (Paul Armstrong & Associates, 2006).

The Australian Bustard (*Ardeotis australis*) lives in wooded grasslands (including spinifex), chenopod flats, low heathland and farmed areas. Although not reported in the fauna survey by ATA Environmental (2007), local environmental staff working in the mining operations, have reported them in the area in recent years. Given that the proposed clearing represents a very small fraction of similar habitat in the general area, it is unlikely to have any significant impact on this species (ATA Environmental, 2007).

A site reconnaissance was conducted on the 6th and 10th of January 2006 and 11th of October, it involved a site visit to examine the available fauna habitat for amphibians, reptiles, mammals and birds (ATA Environmental, 2006). As a result of the site visit there were no significant fauna species observed in the application area and no significant areas of habitat found for the species mentioned above (ATA Environmental, 2006).

A site inspection by Paul Armstrong in 2006 identified three habitat types in the application area, these included Mulga Shrubland with Sheoak, Salmon Gum Woodland and *Eucalyptus eremicola* Woodland (Paul Armstrong & Associates, 2006). Of the three habitat types mentioned Salmon Gum Woodlands are thought to be the most important as Salmon Gums (*Eucalyptus Salmonophloia*) provide an important source of habitat for native animals through hollow formations (Department of Conservation and Land Management, 2005). The majority of Salmon Gum trees observed in the application area were around 10-15m in height; this is generally too small for trees to bear hollow formations (Rose, 1993). Paul Armstrong (2006) has stated that there were only two trees with hollows within the application area. He has also stated that there were other areas within the mining lease where Salmon Gums were larger and provided more suitable areas for habitat (Paul Armstrong & Associates, pers. comm., April 16, 2007). Considering the proximity of the application area to the TSF, other mine site infrastructure and the history of grazing on the mining lease, it is highly unlikely that the application area provides an area of outstanding fauna habitat in comparison to surrounding areas.

ATA Environmental (2006) advise that the vegetation found within the area proposed for clearing is well represented in adjacent areas. The habitat types found (Mulga Shrubland with Sheoak, Salmon gum Woodland and *Eucalyptus eremicola* Woodland) have been comprehensively surveyed elsewhere in the bioregion and there is nothing in the available data to suggest that the fauna habitat within the application area is likely to be unique or of particular conservation significance. The proposed clearing of this site is unlikely to have any significant affect on species or ecosystems of conservation significance (ATA Environmental, 2006).

CALM (2006) advise that the proposal is unlikely to have an impact on any significant environmental values, and on this basis is unlikely to be at variance to this principle.

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

Methodology ATA Environmental (2007).

CALM (2006).
Department of Conservation and Land Management (2005).
Massam & Chapman (2005).
Paul Armstrong & Associates (2006).
Rose (1993).

(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 the available DEC datasets, no Priority or Declared Rare Flora (DRF) species are known to occur within the area under application (GIS Database). The closest DRF species *Eremophila praecox* is located approximately 40 kilometres to the south east of the site (GIS Database).

A desktop survey of the proposed clearing site and adjacent areas within the BSN lease was carried out by Paul Armstrong and Associates in December 2006. The desktop survey involved a search of CALM's Declared Rare and Priority flora database to identify rare and priority species that may exist within the project area. The results of the database search revealed that thirteen species of DRF and Priority Flora potentially occur in the region where the BSN lease area is located (Paul Armstrong & Associates, 2006). The nearest known Priority Flora *Acacia epedunculata* (Priority 1) was recorded 24kilometres to the north west of the mine. No DRF or Priority species were found within the application site (Paul Armstrong & Associates, 2006).

No DRF or Priority flora were recorded during the field survey (Paul Armstrong & Associates, 2006).

The vegetation associations present across the survey area have both extensive local and regional coverage; it is unlikely that the vegetation proposed to be cleared is necessary for the in-situ existence of significant flora species (Paul & Armstrong & Associates, 2006). The flora report completed by Paul Armstrong & Associates also states that there are numerous sites within and around the BSN lease where vegetation is similar or in better condition. CALM (2006) advise that the proposal is unlikely to have an impact on any significant environmental values, and on this basis is unlikely to be at variance to this principle.

Based on the above the proposed clearing is not likely to be at variance with this principle.

Methodology

CALM (2006).
Paul Armstrong and Associates (2006).
Shepherd (2001).
GIS Databases:
-Declared Rare and Priority Flora List - CALM 01/07/05.
-Pre-European Vegetation - DA 01/01.

(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) identified within the area applied to be cleared (GIS Database). The nearest known TEC is located approximately 163 kilometres south-east of the area under application. Furthermore, no known TECs are listed in the Murchison 1 - East Murchison IBRA subregion (Cowan, 2001). CALM (2006) advise that the proposal is unlikely to have an impact on any significant environmental values.

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

Methodology

CALM (2006).
Cowan (2001).
GIS Databases:
- Threatened Ecological Communities - CALM 12/4/05.

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

Comments

Proposal is not likely to be at variance to this Principle

Approximately 100% of the Pre-European vegetation remains in the IBRA Murchison subregion within which the proposal is located (Shepherd, 2001). Available satellite imagery of the area under focus indicates that the areas surrounding the application area have not been cleared extensively (GIS Database). As a result the proposed clearing can not be considered a significant remnant of native vegetation.

	Pre-European Area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	% in IUCN Class I-IV Reserves*
IBRA Bioregion - Murchison	28,206,195	28,206,195	100%	Least concern	1.1%
City of Kalgoorlie/Boulder	No Information Available				
Beard Vegetation Association - -20	1,558,296	1,552,012	99.6%	Least concern	13.1%

* Shepherd et al. (2001)
** 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 et al. (2001).
GIS Databases:
- Pre-European Vegetation - DA 01/01.
- Interim Biogeographic Regionalisation of Australia - EA 18/10/00.

(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 not likely to be at variance to this Principle**
There are no watercourses or wetlands present within the proposed clearing area (GIS Database). Several minor, non-perennial watercourses are situated in close proximity to the area under application, however, these are upslope of the project area and will not be impacted upon by any clearing associated with this proposal.

Based on the above the proposal is not likely to be at variance to this principle.

Methodology GIS Databases:
- Hydrography, linear - DOE 01/02/04.
- Lakes 250K - GA.

(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 area proposed to be cleared is located on the Helag land system which is described as hard pan plains and central drainage tracts with mulga and minor chenopod shrublands (DAFWA, 2007). DAFWA (2007) advise that the red earth on hard pan soils likely to be encountered on the site, and land down gradient are prone to erode where natural surface flows are altered. Loss of native vegetation down gradient is also likely to occur through water starvation if the sheet flow regime is altered (DAFWA, 2007).

The topography across the site is flat and there are no salt lakes, clay pans, creeks, tributaries or other significant surface hydrological features within a 5 kilometres radius of the project area (GIS Database). Drains are installed around the Black Swan Nickel site to divert surface water flow around the mining activities and redirect this flow back to the course of the natural flow. The redirection of this sheet flow regime avoids any potential starvation of native vegetation down gradient (Black Swan Nickel, 2007).

Topsoil and vegetation will be removed and stockpiled separately for later use in rehabilitation programs (Black Swan Nickel, 2007).

In consideration of the above, DAFWA (2007) advise that the proposed management strategies should be adequate to avoid land degradation impacts identified in the assessment of this proposal.

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

Methodology Black Swan Nickel (2007).
DAFWA (2007).
GIS Databases:
-Topographic Contours, Statewide - DOLA 12/09/02.
-Rivers 250K GA.
-Hydrography, Linear DOE 1/2/04.

(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 Bullock Holes Timber Reserve, located approximately 9.2 kilometres south-east of the area proposed to be cleared, is the nearest DEC managed conservation area to the proposal (GIS Database). It is not considered that the vegetation within the project area would provide a significant ecological linkage to this conservation area.

CALM (2006) advise that the proposal is unlikely to have an impact on any significant environmental values, and based on the separating distance between the project area and the nearest DEC managed reserve, the proposed clearing is not likely to be at variance to this principle.

Based on the above the proposal is not likely to be at variance with this principle.

Methodology

CALM (2006).
GIS Databases:
- Pre-European Vegetation - DA 01/01.
- CALM Managed Lands and Water - CALM 1/07/05.

(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 watercourses or wetlands within the area proposed to be cleared (GIS Database), consequently, the mining developments associated with this proposal will not have any impact upon surface water quality. The area to be cleared does not fall within a Public Drinking Water Source Area (GIS Database).

Several bores are located within the BSN lease area, and these are routinely monitored and hydrological measurements taken (Black Swan Nickel, 2007). According to Rockwater (2005), the pH of the groundwater across the area under application is mostly in the range of 7 to 8, and is unlikely to be impacted upon by the clearing associated with the proposal. Depth to groundwater ranges between 14 and 42 metres, and the size of the clearing associated with this proposal is not likely to significantly increase rainfall recharge so as to impact on the depth to groundwater. The natural salinity of the groundwater in the project area varies from between 28,000 to 56,000 milligrams per litre of Total Dissolved Solids (TDS) and is considered saline-hypersaline (Rockwater, 2005). It is therefore unlikely that groundwater quality would be affected significantly as the proposal is relatively small and the groundwater is already saline.

The area of native vegetation to be cleared is unlikely to have an impact on regional groundwater levels considering the magnitude of the regional Yilgarn-Goldfields groundwater province (>296,000 sq km) and the extent of native vegetation remaining in the Murchison Bioregion, which is approximately 100 % (Shepherd et al, 2001).

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

Methodology

Black Swan Nickel (2007).
Rockwater (2005).
GIS Database:
-Hydrography, Linear DOE 1/2/04.
-Public Drinking Water Source Areas (PDWSAS) DOW 1(DISPLAY).
-Rivers 250K.

(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 nearest meteorological office to the application site is the Kalgoorlie MET office, which is located 55 kilometres to the south west of the area proposed to be cleared (BoM, 2006). Kalgoorlie-Boulder has a dry climate with hot summers and cool winters. With an average annual rainfall of 260 mm and annual average evaporation of 2,664 mm (BoM, 2006), there is likely to be little surface flow during normal seasonal rains. Thunderstorms provide most of the summer rainfall, often producing heavy localised falls in short periods. Decaying tropical cyclones, originating off the north-west coast occasionally move through the Goldfields, producing heavy rains and sometimes flooding (BoM, 2006).

The size of the proposed clearing is unlikely to be large enough to increase the incidence or intensity of flooding significantly in the local area.

Based on the above, the proposal is not likely to be at variance to this principle.

Methodology

BoM (2006).

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

Comments

There are two native title claims over the area under application; WC98/027 and WC99/030. These claims have been registered with the National Native Title Tribunal on behalf of the claimant groups (GIS Database). However, the mining tenements have been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (ie. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are no known Aboriginal sites of significance within the area under application (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no sites of Aboriginal 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 applicant (Black Swan Nickel Mine) has submitted a mining proposal under the *Mining Act 1978* for the proposed TSF expansion. This mining proposal must be approved by DOIR prior to the commencement of the TSF expansion project.

Methodology GIS Databases:
- Aboriginal Sites of Significance - DIA 04/07/02.
- Native Title Claims - DLI 19/12/04.

4. Assessor's recommendations

Purpose	Method	Applied area (ha)/ trees	Decision	Comment / recommendation
Mineral Production	Mechanical Removal	19.5	**Grant**	The proposal has been assessed against the clearing principles. The proposal is not likely to be at variance to any of the clearing principles. The assessing officer therefore recommends that the permit be granted.

5. References

ATA Environmental (2006) Fauna assessment - Proposed clearing for a waste rock dump expansion, Black Swan Nickel - Report 2006/40. Prepared for LionOre Australia Pty Ltd, March 2006.

BoM (2006) Bureau of Meteorology website - www.bom.wa.gov.au.

Cowan, S. (2001) Murchison 1 (MUR1 - East Murchison subregion) in 'A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002'. Report published by the Department of Conservation and Land Management, Perth, Western Australia.

Department of Conservation and Land Management (2005). Wildlife Notes. Department of Conservation and Land Management, Perth.

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.

Hopkins, A.J.M., Beeston, G.R. and Harvey J.M. (2001) A database on the vegetation of Western Australia. Stage 1. CALMScience after J. S. Beard, late 1960's to early 1980's Vegetation Survey of Western Australia, UWA Press.

Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Massam, M. & Chapman, T. (2005) Fauna Note No 24/2005 Western Rosella. Prepared for the Department of Conservation and Land Management, URL: http://www.naturebase.net/pdf/plants_animals/living_with_wildlife/2405_western_rosella.pdf

Paul Armstrong & Associates (2006) Vegetation survey and rare flora search at Black Swan Nickel project. Unpublished report prepared for LionOre Australia (Black Swan Nickel) Pty Ltd, dated December 2006.

Rockwater (2005) Quarterly Report - Water Quality Data, November 2005. Prepared by Rockwater for Black Swan Nickel Pty Ltd.

Rose, P.W. (1993) Production of Habitat Hollows by Wheatbelt Eucalyptus. Final Report Save the Bush Grant 1991/2 Project R053. Report prepared by Rose and Bending Forest and Environmental Consultants for the Department of Conservation and Land Management.

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

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

6. Glossary

Acronyms:

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

Definitions:

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

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

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

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

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

P1 **Priority One: Taxa with few, poorly known populations on threatened lands**: Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

P2 **Priority Two: Taxa with few, poorly known populations on conservation lands**: Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

P3 **Priority Three: Taxa with several, poorly known populations, some on conservation lands**: Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

P4 **Priority Four: Taxa in need of monitoring**: Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.

P5 **Priority Five: Taxa in need of monitoring**: Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

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

EX **Extinct:** A native species for which there is no reasonable doubt that the last member of the species has died.

EX(W) **Extinct in the wild:** A native species which:
(a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
(b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.

CR **Critically Endangered:** A native species which is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.

EN **Endangered:** A native species which:
(a) is not critically endangered; and
(b) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.

VU **Vulnerable:** A native species which:
(a) is not critically endangered or endangered; and
(b) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.

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