



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 3495/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Harmony Gold Pty Ltd - Mt Magnet Gold NL

1.3. Property details

Property: Mining Lease 58/136
Mining Lease 58/172
Mining Lease 58/181
Mining Lease 58/191
Mining Lease 58/205
Local Government Area: Shire of Mount Magnet
Colloquial name: Galaxy Open Pit Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
55		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 scale of 1:250,000 for the whole of Western Australia. Two Beard Vegetation Associations are located within the application areas (Shepherd, 2007):

Beard Vegetation Association 312: succulent steppe with very open shrubs; very sparse mulga and *Acacia sclerosperma* over saltbush and bluebush; and

Beard Vegetation Association 313: succulent steppe with open scrub; scattered *Acacia sclerosperma* and *Acacia victoriae* over bluebush.

Niche Environmental Services conducted a flora and vegetation survey of the application areas in September 2009. Nine vegetation units were identified within the application areas (Niche Environmental Services, 2009):

1: Rehabilitation vegetation comprised of a mix of *Acacia* spp. and *Eucalyptus* spp. over an understorey of *Maireana* spp.

This vegetation was widespread within the Perseverance project area.

2: Low Woodland of *Acacia* spp. over Low Open Shrubland of mixed species in an ephemeral drainage line.

This vegetation consisted of an overstorey to 4 metres of *Acacia aneura* var. *aneura*, *A. craspedocarpa*, *A. tetragonophylla* and *A. ramulosa* var. *ramulosa* over an understorey of *Ptilotus obovatus*, *Enchylaena tomentosa* ssp. *tomentosa*, *Atriplex nummularia* and *Eremophila lachnocalyx*. This vegetation association was assessed as being in poor condition. The vegetation was on close proximity to a waste landform and was dissected by two haul roads.

3: Low Open Forest of *Acacia* spp. over Low Open Shrubland of mixed species over Very Open Herbland of mixed species in an ephemeral drainage line.

The vegetation consisted of an overstorey to 4 metres of *Acacia aneura* var. *aneura*, *A. tetragonophylla*, *A. craspedocarpa*, *A. aneura* var. *fuliginea* and *A. ramulosa* var. *ramulosa* over a midstorey of *Eremophila clarkei*, *E. galeata*, *E. georgei* and *Thryptomene costata* over an understorey of *Stenopetalum filifolium*, *Olearia stuartii*, *Maireana planifolia*, *Trachymene costata*, *Velleia rosea*, *Pogonolepis stricta* and *Eriachne pulchella* ssp. Vegetation in this association was noted as being in good condition. Whilst the drainage line had been dissected by roads and tracks and had also been affected by proximity to mining infrastructure, the vegetation was comparatively diverse and the structure of the creek bed was intact.

4: Low Woodland of *Acacia* spp. over Low Open Shrubland of mixed species on a low Banded Ironstone Formation (BIF).

This vegetation association consisted of an overstorey of *Acacia aneura* var. *aneura*, *A. tetragonophylla* and *A. ramulosa* var. *ramulosa* over a mid storey of *Philotheca brucei* ssp. *brucei*, *Aluta aspera* spp. *hesperia* and *Eremophila latrobei* ssp. *latrobei* over an understorey of *Arthropodium dyeri*, *Cheilanthes seiberi* and *Eragrostis eriopoda*. Vegetation within this association was noted as varying from poor to good condition. The vegetation

was located on a series of BIF ridges that had been affected by historic and ongoing activities associated with mining and exploration.

5: Low Woodland of *Acacia* spp. over Low Open Shrubland of mixed species on gibber flat with quartz and ironstone.

The vegetation consisted of an overstorey to 4 metres of *Acacia aneura* var. *aneura*, *A. tetragonophylla*, *A. ramulosa* var. *ramulosa* over a midstorey of *Eremophila latrobei* spp. *latrobei*, *E. lachnocalyx* and *E. clarkei*. This vegetation association was assessed as being in good condition. The vegetation was noted as having been affected by disturbances associated with proximity to a road and a waste landform.

6: Low Open Woodland of *Acacia* spp. over a Low Open Shrubland of mixed species on flats.

This vegetation was widespread across the project area. This vegetation consisted of an overstorey to 4 metres of *Acacia aneura* var. *aneura*, *A. ramulosa* var. *ramulosa* and *A. aneura* var. *fuliginea* over a midstorey of *Eremophila forestii* spp. *forestii* and *Ptilotus obovatus*. This vegetation was assessed as being in poor to degraded condition, with the vegetation clearly affected by a large number of tracks, historic mining and exploration activities and the impacts of grazing by goats.

7: Low Open Woodland of *Acacia* spp. over a Low Open Shrubland of mixed species on lower gibber slopes of BIF ridges.

The vegetation consisted of an overstorey to 4 metres of *Acacia aneura* var. *aneura* and *A. ramulosa* var. *ramulosa* over a Low Open Shrubland of *Eremophila forestii* ssp. *forrestii* and *Ptilotus obovatus*. The vegetation in this association was assessed as being in poor to degraded condition. The vegetation was heavily impacted by a number of tracks and old workings in the area, as well as the impacts of grazing by goats.

8: Low Open Shrubland of *Tecticornia disarticulata* on a clay pan.

This association was depauperate of species, with the main species being *Tecticornia disarticulata*. This vegetation association was assessed as being in degraded condition, with a number of tracks dissecting the area.

9: Rehabilitation vegetation comprised of a mix of *Acacia* spp. and *Eucalyptus* spp. over an understorey of *Maireana* spp.

Clearing Description

Harmony Gold (2009) proposes to clear up to 55 hectares of native vegetation and rehabilitation vegetation, within an area equalling approximately 204.9 hectares. The proposed clearing is located approximately 5 kilometres west of Mount Magnet (GIS Database).

The purpose of the proposed clearing is for the purpose of an open pit cut-back mining programme and to facilitate the creation of new waste rock landforms, mine related infrastructure and for the diversion of the Boogardie – Mt Farmer Road (Niche Environmental Services, 2009). Vegetation will be cleared by bulldozer and vegetation and topsoil will be stockpiled for rehabilitation purposes (Harmony Gold, 2009).

Vegetation Condition

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

To

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

Comment

The vegetation condition rating is derived from a flora and vegetation survey conducted by Niche Environmental Services in September 2009. The vegetation applied to be cleared consists of native vegetation in addition to rehabilitation vegetation (Harmony Gold, 2009). The vegetation within the application areas has previously been disturbed by past and present mining activities, haul roads and access tracks and grazing (Niche Environmental Services, 2009).

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 may be at variance to this Principle

The application areas are located within the Eastern Murchison subregion of the Murchison Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). The Eastern Murchison subregion is described by CALM (2002) as being rich and diverse in both its flora and fauna. CALM (2002) reports that most species are wide ranging and usually occur in at least one, and often several, adjoining subregions.

There were four weed species identified within the application area; Prickly Pear (*Opuntia stricta*), Tree Tobacco (*Nicotiana glauca*), Peppercorn Tree (*Schinus molle*) and Blue Pimpernel (*Anagallis amensis* ssp. *caerulea*) (Niche Environmental Services, 2009). The presence of introduced weed species lowers the biodiversity value of the proposed clearing areas. Care must be taken to ensure that the proposed clearing activities do not spread or introduce weed species to non-infested areas. The risk of spreading weed species can be mitigated by imposing a condition for the purpose of weed management.

Niche Environmental Services conducted a flora and vegetation survey of the application areas in September 2009. A total of 119 plant taxa representing 35 families and 67 genera were recorded within the survey area (Niche Environmental Services, 2009). Niche Environmental Services (2009) reports the following families as

being the most dominant; *Chenopodiaceae* (17 taxa), *Fabaceae* (previously *Mimosaceae*) (16 taxa), *Asteraceae* (12 taxa), *Myoporaceae* (8 taxa) and *Poaceae* (8 taxa). Other flora and vegetation surveys have been conducted in areas adjacent to the application areas and the application areas are noted as being comparable to these other surveyed areas in terms of diversity of species recorded and specific species records (Niche Environmental Services, 2009). Despite this however, given that the application areas have been degraded by past and current mining activities and grazing, the flora diversity appears to be quite high.

Outback Ecology conducted a desktop survey of the application area and adjacent areas in November 2009. Based on the results of this survey a total of 189 terrestrial fauna species have the potential to occur within the search area (Outback Ecology, 2009). These fauna species comprise of 22 mammals (16 native and 6 introduced), 117 native birds, 42 native reptiles and 8 amphibian species (Outback Ecology, 2009). The application areas are reported by Niche Environmental Services (2009) as being in primarily degraded condition due to previous and current mining activities, haul roads, exploration lines, informal tracks and grazing. Given this, it is unlikely that all the fauna species identified during the desktop survey would occur within the application areas and it is likely that the higher quality vegetation found in areas outside of the minesite footprint would have higher fauna diversity than the application areas.

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

Methodology CALM (2002)
Niche Environmental Services (2009)
Outback Ecology (2009)
GIS Database
- Interim Biogeographic Regionalisation for Australia

(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

Outback Ecology conducted a terrestrial fauna desktop search on behalf of Harmony Gold in November 2009. The fauna search was conducted for nine mining tenements, three of which occur within the application areas; Mining Leases 58/181, 58/191 and 58/172 (Outback Ecology, 2009). No site inspection was undertaken and the results from the fauna search are conclusions based on a desktop study only (Outback Ecology, 2009). Outback Ecology identified six fauna habitats within the search area, based on the results from online database searches and previous surveys conducted in the area. Based on the vegetation units identified by Niche Environmental Services (2009), the following four fauna habitats identified by Outback Ecology (2009) are the most likely to occur within the application areas:

- Mixed *Acacia* and *Eucalyptus* species rehabilitation;
- Mixed *Acacia* woodlands;
- Minor drainage lines; and
- Shrub plains and claypans.

The vegetation within the application areas has suffered disturbance from past and present mining activities, tracks, roads and grazing (Niche Environmental Services, 2009). Furthermore, the vegetation within the application areas is widespread locally, and within the Murchison bioregion generally (Niche Environmental Services, 2009). Harmony Gold (2009) reports that the vegetation within the application areas has no connectivity with surrounding areas of vegetation and therefore, would be unlikely to serve as a corridor for the movement of native fauna. Based on the above, the vegetation of the application areas would be unlikely to represent significant habitat for any fauna species and fauna species would be more likely to utilise the higher quality vegetation that exists in areas outside of the Harmony minesite footprint.

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

Methodology Harmony Gold (2009)
Niche Environmental Services (2009)
Outback Ecology (2009)

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

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

Niche Environmental Services conducted a flora and vegetation survey of the application areas in September 2009. This survey consisted of a database search, in addition to a field survey (Niche Environmental Services, 2009). The database search consisted of a search of the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* Protected Matters Database, a search of the Department of Environment and Conservation online databases, in addition to a review of previous surveys that have been conducted in the area (Niche Environmental Services, 2009). The field based survey was conducted between 11 September 2009 and 14 September 2009 and consisted of a preliminary reconnaissance in addition to releve and ground-truthing (Niche Environmental Services, 2009).

Niche Environmental Services (2009) reports that no Declared Rare Flora was identified during the survey,

however, the following three Priority flora species were recorded within the application areas:

- *Acacia speckii* (Priority 3);
- *Stenanthemum mediale* (Priority 1); and
- *Verticordia jamiesonii* (Priority 3).

Acacia speckii is described by Western Australian Herbarium (1998 – 2010) as preferring rocky hills over granite, basalt or dolerite, rocky hills or rises. This species has been recorded numerous times in areas adjacent to the application areas (Niche Environmental Services, 2009).

Stenanthemum mediale is reported by Western Australian Herbarium (1998 – 2010) as preferring red clayey sands. The Western Australian Herbarium (1998 – 2010) have nine records of this species and some of these records appear to come from quite large populations. In addition, there have been records of plants of this species occurring in areas adjacent to the application areas (Niche Environmental Services, 2009).

Verticordia jamiesonii is generally found in sandy clay soils and on lateritic breakaways (Western Australian Herbarium, 1998 – 2010). The Western Australian Herbarium (1998 – 2010) database has 29 records of this species and from these records it would appear that this species often occurs in quite large populations. Niche Environmental Services (2009) report that approximately 30 plants were recorded in the area in addition to another 10 plants recorded approximately 100 metres south-east.

Harmony Gold (2009) reports that no populations of Priority flora will be impacted by the proposed clearing.

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

Methodology Harmony Gold (2009)
Niche Environmental Services (2009)
Western Australian Herbarium (1998 ? 2010)

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

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

There are no known Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs) within the areas applied to clear (GIS Database). The nearest known PEC is located approximately 10 kilometres north-east of the application areas (GIS Database).

Niche Environmental Services (2009) reports that no TECs or PECs were identified during the flora and vegetation survey of the application areas.

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

Methodology Niche Environmental Services (2009)
GIS Database
- Threatened Ecological Communities

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

Comments Proposal is not at variance to this Principle

The application areas fall within the Murchison Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). Shepherd (2007) reports that approximately 100% of the pre-European vegetation still exists within this bioregion (see table below). The vegetation within the application areas is recorded as the following two Beard Vegetation Associations (Shepherd, 2007):

- **Beard Vegetation Association 312:** succulent steppe with very open shrubs; very sparse mulga and *Acacia sclerosperma* over saltbush and bluebush; and
- **Beard Vegetation Association 313:** succulent steppe with open scrub; scattered *Acacia sclerosperma* and *Acacia victoriae* over bluebush.

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

Therefore, the vegetation within the application areas is not a significant remnant of native vegetation within an area that has been extensively cleared.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion - Murchison	28,120,590	28,120,590	~100	Least Concern	~1.1
Beard vegetation associations - State					
312	41,502	41,502	~100	Least Concern	
313	68,844	68,844	~100	Least Concern	
Beard vegetation associations - Bioregion					
312	41,502	41,502	~100	Least Concern	
313	68,844	68,844	~100	Least Concern	

* 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
- Interim Biogeographic Regionalisation of Australia

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

Comments Proposal is at variance to this Principle

The application areas have numerous ephemeral drainage lines crossing them (GIS Database). These drainage lines are reported by Harmony Gold (2009) as being highly disturbed and have been dissected by existing roads and infrastructure. Harmony Gold (2009) reports that due to this disturbance these ephemeral watercourses have no connection to other drainage lines in the area, and aerial photographs of the site would support this.

Harmony Gold (2009) reports that although the density of vegetation increased within the ephemeral drainage lines, the vegetation was noted as consisting of the same species occurring on the plains and ridges and was not groundwater dependent vegetation.

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

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

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

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

The application areas have been mapped as occurring within five land systems (GIS Database). The following four land systems are the most at risk of land degradation based on land system descriptions by Pringle et al. (1994) and Curry et al. (1994) and landforms within the application areas:

Austin Land System: Saline stony plains with low rises and drainage foci supporting low halophytic shrublands with scattered mulga; occur mainly adjacent to lakes Austin and Annean, below greenstone hill systems (Curry et al., 1994). Drainage tracts in this system may be susceptible to erosion if perennial vegetation is degraded (Curry et al., 1994).

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

Violet Land System: Undulating stony and gravelly plains and low rises, supporting mulga shrublands (Pringle et al., 1994). Abundant mantles provide effective protection against soil erosion over most of this land system, except where the soil surface has been disturbed, for example by the construction of tracks and gridlines

(Pringle et al., 1994). In such circumstances the soil becomes moderately susceptible to water erosion (Pringle et al., 1994). Narrow drainage tracts are mildly susceptible to water erosion, however, no drainage lines transect the application area within this land system (GIS Database).

Wiluna Land System: Low greenstone hills with occasional lateritic breakaways and broad stony slopes, lower saline stony plains and broad drainage tracts; supports sparse mulga shrublands with patches of halophytic shrubs (Curry et al., 1994). Sandy surfaced gravelly plains, alluvial fans and plains and drainage floors are moderately susceptible to accelerated erosion when degraded (Curry et al., 1994). The system shows extensive disturbance and localised erosion as a result of mining activities (Curry et al., 1994).

Soil erosion is likely to be fairly minimal in many sections of the application areas due to the low rainfall and gentle topography. The descriptions described above indicate that drainage lines have the largest erosion risk, however, the areas proposed to be cleared are highly disturbed by current and previous mining activities and many of the watercourses have been dissected by existing roads and infrastructure and are reported by Harmony Gold (2009) to have no connection to other drainage lines in the area. Given this, it is unlikely that the proposed clearing will significantly increase the occurrence of land degradation in the area.

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

Methodology Curry et al. (1994)
Harmony Gold (2009)
Pringle et al. (1994)
GIS Database
- Hydrography, linear
- Rangeland Land System Mapping

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

Comments Proposal is not at variance to this Principle

The proposed clearing is not located within any conservation areas (GIS Database). The nearest Department of Environment and Conservation managed land is the Karroun Hill National Park located approximately 180 kilometres south of the application areas (GIS Database).

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

Methodology GIS Database
- Department of Environment and Conservation

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

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

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

Rainfall within the region is low and the topography within the application areas is primarily flat, however, natural flood events are known to occasionally occur within the Murchison region following significant rainfall events. Under these flooding conditions runoff and sheet flow could exacerbate soil erosion, however, as the drainage lines within the application areas have no connection with other drainage lines in the surrounding areas, any impacts are likely to be localised. In addition, Niche Environmental Services (2009) reports that there are few reports of local flooding.

The nearest Public Drinking Water Source Area (PDWSA) is located approximately 100 metres west of the application areas (GIS Database). Given that the application areas are highly disturbed and located within an active minesite, the further clearing of 55 hectares of native and rehabilitation vegetation is unlikely to have any significant impact on surface or groundwater quality or groundwater quantity.

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

Methodology Niche Environmental Services (2009)
GIS Database
- Hydrography, linear
- Public Drinking Water Source Area (PDWSA)

(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

There are numerous ephemeral drainage lines within the application areas (GIS Database). Due to a climate with low annual rainfall and high annual evaporation rates, these drainage lines are expected to be dry for the

majority of the year (Niche Environmental Services, 2009).

The application areas and adjacent areas are highly disturbed from current and previous mining activities and from grazing (Niche Environmental Services, 2009). The removal of sparse vegetation within an area that has an arid to semi-arid climate and few records of local flooding is unlikely to cause or exacerbate the incidence or intensity of flooding (Niche Environmental Services, 2009).

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

Methodology Niche Environmental Services (2009)
GIS Database
- Hydrography, linear

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

Comments

There is one Native Title claim (WC96/098) over the area under application (GIS Database). This claim has been registered with the Native Title Tribunal on behalf of the claimant group. However, the tenements have been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

According to available databases there is one Aboriginal Site of Significance (site ID: 18155) within the application areas (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

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

There were no submissions received during the public comments period.

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

4. Assessor's comments

Comment

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

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

5. References

- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002. Department of Conservation and Land Management, Western Australia.
- Curry, P., Payne, A., Leighton, K., Hennig, P. and Blood, D. (1994) Technical Bulletin: An Inventory and condition survey of the Murchison River Catchment and surrounds, Western Australia. Technical Bulletin 84. Department of Agriculture, 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.
- Harmony Gold (2009) Clearing Permit Application Supporting Documentation, December 2009.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Niche Environmental Services (2009) Level 1 Flora and Vegetation Survey over Galaxy Project Area, Harmony Gold Mt Magnet. Unpublished report. Niche Environmental Services, Western Australia.
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- Pringle, H., Van Vreeswyk, A. and Gilligan, S. (1994) An Inventory and condition survey of the north-eastern Goldfields, Western Australia. Technical Bulletin 87. Department of Agriculture, Western Australia.
- Shepherd, D.P. (2007). Adapted from: Shepherd, D.P., Beeston, G.R., and Hopkins, A.J.M. (2001), Native Vegetation in Western Australia. Technical Report 249. Department of Agriculture Western Australia, South Perth. Includes subsequent updates for 2006 from Vegetation Extent dataset ANZWA1050000124.
- Western Australian Herbarium (1998 - 2010) Florabase - The Western Australian Flora. Department of Environment and Conservation. Available online from: <http://florabase.dec.wa.gov.au>. Accessed 6 January 2010.

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.