



1. Application details

1.1. Permit application details

Permit application No.: 2766/1
Permit type: Area Permit

1.2. Proponent details

Proponent's name: B J Young Earthmoving Pty Ltd

1.3. Property details

Property: Mining Lease 45/681
Local Government Area: Town of Port Hedland
Colloquial name: Sand Mining Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
49		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
<p>Beard vegetation associations have been mapped at a 1:250,000 scale for the whole of Western Australia. One Beard vegetation association is located within the application area; 589: Mosaic: Short bunch grassland savanna, with soft Spinifex hummock grasslands (Shepherd et al., 2001; GIS Database).</p> <p>Astron Environmental conducted a flora survey over three mining leases, including the application area, in August 1997. Astron Environmental (1997) sampled areas of approximately 100m x 100m. Data collected included information about major flora species including their approximate cover and height, as well as priority and significant flora and weed species (Astron Environmental, 1997). Astron Environmental (1997) identified four vegetation units during the flora and vegetation survey:</p> <p>Unit 1: Mid-Dense <i>Triodia epactia</i> Hummock Grassland with Mid-dense Low <i>Acacia translucens</i> Heath, sparse Open Low Scrub and Very sparse Open Low Woodland.</p> <p>This unit is closely integrated with Unit 3, as well as Unit 4 which occurs on the burnt areas. The mid-dense <i>Triodia epactia</i> grassland is dominant but there are occasional occurrences of other grasses between hummocks, including <i>Eriachne helmsii</i>, <i>Yakirra australiensis</i>, <i>Aristida browniana</i>, <i>Eragrostis eriopoda</i> and <i>Paraneurachne muelleri</i>. The low heath of <i>Acacia translucens</i> varies in density. The sparse open low scrub is largely dominated by <i>Acacia tumida</i> with less frequent <i>Acacia cowleana</i>, <i>A. inaequilatera</i>, <i>A. coleii</i>, <i>A. coriacea</i>, <i>Hakea suberea</i> and <i>Carissa lanceolata</i>. This shrubland is more dense on the sand ridge of Mining Lease 45/681. Isolated low trees of either <i>Owenia reticulata</i> or <i>Corymbia candida</i> subsp. <i>laetifolia</i> (ex. <i>Eucalyptus aspera</i>) and <i>Corymbia</i></p>	<p>This clearing permit application is for an area permit to clear up 49ha of native vegetation (GIS Database). The proposed clearing is located on Mining Lease 45/681, approximately 14km south-west of Port Hedland (GIS Database).</p> <p>The purpose of the proposed clearing is for the development of a sand mining operation. There will be no infrastructure onsite apart from an access road into the quarry and a gate (BJ Young, 2008). The depth of excavation is anticipated to be approximately 2m (BJ Young, 2008). Vegetation and topsoil will be rolled into stockpiles for use in progressive vegetation (BJ Young, 2008).</p>	<p>Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994).</p>	<p>The vegetation condition rating was obtained from BJ Young (2008). The vegetation within Mining Lease 45/681 was not overly disturbed and was relatively free of weeds (BJ Young, 2008).</p>

zygophylla (ex. *Eucalyptus zygophylla*) occur.

Unit 2: Mixed Mid-Dense *Triodia/Plectrachne* Hummock Grassland with Mid-dense Low *Acacia translucens* Heath and Open Herbs.

The hummock grassland is co-dominated by *Triodia epactia* and *Plectrachne schinzii* with frequent *Aristida browniana* and occasional *Eragrostis eriopoda*. The dwarf scrub cover of *Acacia translucens* is dominant with infrequent *Dodonea coriacea*. Herbs include *Ptilotus calostachyus*, *P. fusiformis*, *P. polystachyus*, *P. exaltatus*, *Bonamia rosea*, *Pimelea ammocharis* and *Euphorbia australis*. This unit comprises the dominant components of Unit 1 (*Triodia epactia* grassland) and Unit 3 (*Plectrachne schinzii* grassland).

Unit 3: Dense *Plectrachne schinzii* Hummock Grassland with Dwarf Scrub of *Acacia translucens* and very sparse Open Low Woodland.

Dense *Plectrachne schinzii* dominates with dwarf scrub of *Acacia translucens* with some *Dodonea coriacea*. There is a very sparse woodland (generally small isolated populations) of *Dolichandrone heterophyllai*, *Hakea suberea* and occasionally *Corymbia candida* subsp. *lautifolia*. Herbs include *Ptilotus calystachyus*, *P. fusiformis*, *P. polystachyus* and *Hybanthus auranticus*.

Unit 4: Sparse Open mixed Hummock and Tussock grassland with Open Dwarf Scrub and Herbs.

Tussock grasses *Aristida browniana*, *Eriachne gardnerii*, and occasional *T. epactia* occur with very low *Acacia tumida*, *A. cowleana*, *A. translucens* and *Senna notabilis*. There is a dense and varied herbland including *Solanum phlomoides*, *Corchorus* sp., *Bonamia rosea*, *Merremia davenportii*, *Triufetta ramose*, *Sida rohlenae*, *Sida* sp., *Polymeria ambigua*, *Bulbostylis barbata*, *Mollugo molluginis* and *Impomoea muelleri*. This unit occurs on fire burnt patches. The stages of vegetation on these areas indicate a history of burns.

3. Assessment of application against clearing principles

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

Comments

Proposal is not likely to be at variance to this Principle

The application area is located within the Roebourne Interim Biogeographic Regionalisation for Australia (IBRA) sub-region (GIS Database). The Roebourne sub-region primarily consists of quarternary alluvial plains with a grass savannah of mixed bunch and hummock grasses, and dwarf shrub steppe of *Acacia stellaticeps* over *Triodia pungens* (CALM, 2002). The climate of the Roebourne sub-region is semi-arid-tropical with summer rain and has significant cyclonic activity (CALM, 2002).

The general landscape topography of Mining Lease 45/681 is a low relief sheetwash colluvium and alluvium, approximately 10 to 12m above sea level (BJ Young, 2008). The resource is a low flat dune with minimal clay content sand and particle size varies from fine to course sand grains (BJ Young, 2008). The vegetation community is described generally as *Acacia Spinifex* Low Heath with some slight scrub / very open woodland (BJ Young, 2008). The vegetation units found within the mining lease are typical of those found in the vicinity of Port Hedland on red loamy soils and pindan sands (Astron Environmental, 1997).

A flora survey of the application area was conducted by Astron Environmental in August 1997. This survey identified a total of 85 flora species from 59 genera belonging to 32 families (Astron Environmental, 1997). The flora families with the most species richness were identified as: Grass family (*Poaceae*), Morning Glory family (*Convolvulaceae*), *Acacia* family (*Mimosaceae*) and Hibiscus family (*Malvaceae*) (Astron Environmental, 1997).

Astron Environmental (1997) identified three weed species during the flora and vegetation survey: Buffel Grass (*Cenchrus ciliaris*), Kapok Grass (*Aerva javanica*) and Windmill Grass (*Chloris virgata*). The presence of these introduced weed species lowers the biodiversity value of the proposed clearing area. Care must be taken to ensure that the proposed clearing activities do not spread or introduce weed species to non-infested areas. Should a clearing permit be granted, it is recommended that a condition be imposed for the purposes of weed management.

The assessor performed a search of the Western Australian Museum Fauna Database for fauna species that may occur within 50km of the application area. The search identified up to 13 mammals from 7 families, 37 birds from 22 families, 72 reptiles from 11 families and 8 amphibians from 2 families (Western Australian Museum, 2008). The results of this search suggest that the area is diverse in reptile species, particularly Skinks (17), Geckos (13) and venomous snakes (13) (Western Australian Museum, 2008).

The landforms, flora species and fauna habitats in the application area are well represented locally and within the Pilbara region generally (BJ Young, 2008). The proposed clearing is unlikely to have any significant impact on the biological diversity of the region.

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

Methodology Astron Environmental (1997)
CALM (2002)
BJ Young (2008)
Western Australian Museum (2008)
GIS Database
- Pre-European Vegetation
- 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

Astron Environmental (1997) described the main habitat type of the application area during their flora and vegetation survey as primarily consisting of relatively uniform spinifex and low shrubland on sandy or pindan soils. Within Mining Lease 45/681 tall vegetation was limited to occasional *Owenia reticulata* and no standing water or water drainage zones were found within the application area (Astron Environmental, 1997).

The application area is located approximately 8km south of the Western Australian coastline (GIS Database) and therefore, it is possible that the area applied to be cleared gets occasional visits from various migratory bird species including the Priority 4 species; Eastern Curlew (*Numenius madagascariensis*) (Western Australian Museum, 2008). However, due to the migratory nature and mobility of these species it is unlikely that the vegetation of the application area represents significant habitat for these species.

The assessing officer has conducted a search of the Western Australian Museum's online fauna database for an area representative of a 50km radius around the application area. The species with the greatest potential to occur within the application area are listed below:

- Northern Quoll (*Dasyurus hallucatus*) – Endangered (*Environmental Protection and Biodiversity Conservation (EPBC) Act, 1999*)
- Bilby (*Macrotis lagotis*) – Vulnerable (*EPBC Act, 1999*)
- Woma Python (*Aspidites ramsayi*) – Priority 1 on the DEC's Threatened and Priority Fauna list
- Flock Bronzewing (*Phaps histrionica*) – Priority 4 on the DEC's Threatened and Priority Fauna list

The Northern Quoll can be found in a range of areas but prefer rocky areas and eucalypt forests as these areas are more likely to contain hollow logs, rock crevices, caves and tree hollows for the species to hide in (Department of Environment, Water, Heritage and the Arts, 2005). As this habitat type is not found within the application area it is unlikely that the vegetation of the application area represents significant habitat for this species.

Bilbies require sandy or loamy soil in which to burrow and they are found in areas where foxes are not abundant which include the driest and least fertile parts of Western Australia (DEC, 2008a). The Bilby has a wide distribution across Australia and within Western Australia they are generally found in mulga scrub and hummock grasslands on sandplains or along drainage or salt lake systems (DEC, 2008a).

Woma pythons are generally found in desert dunefields and on sandy plains, usually with hummock grasses (Government of South Australia, 2008). The Woma is found in patches along the Western Australian coast but has the widest distribution across inland, central Australia ranging from Western Australia through the Northern Territory and South Australia into Queensland and New South Wales (Government of South Australia, 2008).

The Flock Bronzewing ranges throughout open woodland and treeless grass plains (Higgins and Davies, 1996).

This species is known to nest on the ground under the cover of a bush, low branch, grass tussock, or in the dusty, bare ground around bores (Higgins and Davies, 1996). The Flock Bronzewing is highly nomadic and has a patchy distribution through north-western Western Australia, central-southern Northern Territory, western Queensland, north-eastern South Australia and north-western NSW (NSW National Parks and Wildlife Service, 1999).

Based on the wide distributions of the Bilby, Woma python and Flock Bronzewing, it is unlikely that the vegetation of the application area represents significant habitat for these species. The habitat found within the application area is well represented throughout the Port Hedland area and within the Pilbara region generally. Therefore, the vegetation within the application area is unlikely to be significant habitat for any fauna species.

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

Methodology Astron Environmental (1997)
DEC (2008a)
Department of Environment, Water, Heritage and the Arts (2005)
Government of South Australia (2008)
Higgins and Davies (1996)
NSW National Parks and Wildlife Service (1999)
Western Australian Museum (2008)
GIS Database
- Western Australian coastline

(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

Astron Environmental conducted a flora and vegetation survey of the application area in August 1997. The survey involved establishing 100m by 100m quadrats in each vegetation unit and sampling the vegetation within them. In addition, the Department of Environment and Conservation (DEC) performed a desktop rare flora survey on behalf of BJ Young in April 2008. BJ Young (2008) have also analysed literature from previous surveys for Rare and Priority flora information relating to the proposed clearing area.

According to available databases, there are no known records of Declared Rare Flora (DRF) or Priority flora species within the proposed clearing area (GIS Database). The results from the DEC desktop survey and literature review report that eight Priority flora species have been recorded from the Port Hedland area; *Acacia glaucocaesia* (Priority 3), *Euphorbia clementii* (Priority 2), *Gomphrena pusilla* (Priority 2), *Goodenia pascua* (Priority 3), *Gymnanthera cunninghamii* (Priority 3), *Phyllanthus aridus* (Priority 3), *Ptilotus appendiculatus* var. *minor* (Priority 1) and *Tephrosia andrewii* (Priority 1) (BJ Young, 2008; DEC, 2008b). However, no DRF or Priority Flora species have been recorded within the application area during any flora and vegetation surveys (Astron Environmental, 1997; BJ Young, 2008).

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

Methodology Astron Environmental (1997)
BJ Young (2008)
DEC (2008b)
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

There are no known Threatened Ecological Communities (TEC's) within the area applied to clear or within 100km of the application area (BJ Young, 2008; GIS Database).

At such distance from the application area it is unlikely that the proposed clearing will have any impact on any TEC's.

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

Methodology BJ Young (2008)
GIS Database
- Threatened Ecological Communities

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

Comments Proposal is not at variance to this Principle

The application area falls within the IBRA Pilbara Bioregion (GIS Database). Shepherd et al. (2001) report that approximately 99.9% of the pre-European vegetation still exists in this Bioregion (see table below). The vegetation within the application area is recorded as Beard Vegetation Association 589: Mosaic: Short bunch grassland savanna, with soft spinifex hummock grasslands (Shepherd et al., 2001). According to Shepherd et al. (2001) approximately 100% of this vegetation association remains within the Bioregion (see table below).

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

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion – Pilbara	17,804,164	17,794,651	~99.9	Least Concern	6.3
Beard veg assoc. – State					
589	809,764	809,647	~99.99	Least Concern	1.6
Beard veg assoc. – Bioregion					
589	730,724	730,690	~100	Least Concern	1.8

* Shepherd et al. (2001) updated 2005

** 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 Database
- Interim Biogeographic Regionalisation for Australia
- 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 not likely to be at variance to this Principle

There are no watercourses or wetlands within the proposed clearing area (GIS Database, BJ Young, 2008).

The nearest watercourse is the Turner River located approximately 5km west of the application area (GIS Database). At such a distance it is unlikely that the proposed clearing of 49ha of native vegetation would have an impact on any watercourses or wetlands.

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

Methodology BJ Young (2008)
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 is not likely to be at variance to this Principle

The application area is broadly mapped as falling within the Uaroo Land System (GIS Database).

The Uaroo Land System consists of depositional surfaces; level sandy plains up to 10km or more in extent with little organised through drainage; pebbly surfaced plains and plains with calcrete at shallow depth; broad, mostly unchannelled, tracts receiving more concentrated sheet flow (Van Vreeswyk et al., 2004). The relief of the land system is generally less than 10m but does contain hills of up to 30m (Van Vreeswyk et al., 2004). The system supports hard and soft Spinifex and in general the system is not susceptible to erosion or significant vegetation degradation (Van Vreeswyk et al., 2004).

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

Methodology Van Vreeswyk et al. (2004)
GIS Database
- Rangeland 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 close proximity to any conservation areas (GIS Database). The nearest land-based conservation area is the Millstream-Chichester National Park located approximately 130km south-east of the application area (GIS Database).

Given the distance of the application area from any conservation areas, the removal of 49ha of native vegetation is not expected to have an impact on the environmental values of any conservation area.

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

Methodology GIS Database
- CALM Managed Land and Waters

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

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

The application area is located in a semi-desert-tropical region, with an average annual rainfall of approximately 300mm falling mainly during the summer months (ANRA, 2007), and an average annual pan evaporation rate of 3,500mm (BJ Young, 2008). Hence, the presence of surface water resulting from significant rain events is relatively short-lived.

The Turner River Water Reserve is located approximately 5km to the west of the proposed clearing area (GIS Database), however, it is considered unlikely that the shallow sand deposits within the application area would have any hydrological link with the water reserve aquifers (BJ Young, 2008). The hydrological gradient is most likely to flow from the water reserve towards the coast (BJ Young, 2008).

The depth of the water table within the vicinity of the application area is approximately 7m (BJ Young, 2008). The groundwater quality is generally between 1000 to 2000mg/L which is considered suitable for livestock, some domestic use and limited industrial use (Department of Land and Water Conservation, 1999). Based on the above, it is unlikely that the 49ha of proposed clearing would have any significant impacts on surface or groundwater quality, or groundwater levels.

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

Methodology ANRA (2007)
BJ Young (2008)
DEC (2006)
Department of Land and Water Conservation (1999)
GIS Database
- Hydrography - linear
- Geodata - lakes

(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, tropical climate with a wet summer season and a dry winter season (ANRA, 2007). Most rainfall is received during the wet season, but falls can be variable (ANRA, 2007). Rain can either be sporadic (local thunderstorms) or heavy and intense (cyclonic events).

The pindan soils found within the application area allow some infiltration during low to moderate rainfall events, however, during cyclonic events a soil saturation point is reached which results in overland sheet flow (BJ Young, 2008). Due to the extremely high annual evaporation rate, in comparison to the low rainfall as well as the sandy permeable soils and the elevated position of the application area in the landscape, any ponding or overland flow is likely to be of short duration (BJ Young, 2008).

Based on the above, the clearing of 49ha of native vegetation, in comparison to the size of the Port Hedland Coastal catchment area (744,301.7ha) (GIS Database), is not likely to lead to an increase in the incidence or intensity of flooding.

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

Methodology ANRA (2007)
BJ Young (2008)
GIS Database
- Hydrographic Catchments - Catchments

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

Comments

There is one native title claim (WC96/061) over the area under application (GIS Database). This claim has been registered with the National Native Title Tribunal on behalf of the claimant group. However, the tenement has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are no known Aboriginal Sites of Significance within the vicinity of the application area (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no 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 public 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 not at variance to Principle (e), is not likely to be at variance to Principles (a), (b), (c), (d), (f), (g), (h), (i) and (j).

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

5. References

- ANRA (2007). Rangelands overview: Pilbara [online]. Available from:
<http://www.anra.gov.au/tropics/rangelands/overview/wa/ibra-pil.html>. Accessed 3 July, 2008.
- Astron Environmental (1997) Flora and Fauna Survey: Leases M45/531, M45/681, M45/689 Port Hedland. Karratha, Western Australia.
- BJ Young (2008) EP Act - BJ Young Earthmoving P/L - Clearing Permit 2766/1. BJ Young Earthmoving Pty Ltd, Western Australia.
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002. Department of Conservation and Land Management, Western Australia.
- DEC (2006) Proposed Burrup Peninsula Conservation Reserve: Draft Management Plan 2006-2016 [online]. Available from:
http://www.naturebase.net/pdf/national_parks/management/burrup_draft_04072006.pdf. Accessed 3 December, 2008.
- DEC (2008a) Bilby: *Macrotis lagotis* (Reid, 1837). Department of Environment and Conservation. Available online from:
http://www.dec.wa.gov.au/index2.php?option=com_docman&task=doc_view&gid=120&Itemid=942. Accessed 24 November, 2008.
- DEC (2008b) Request for Rare Flora Information. Department of Environment and Conservation, Western Australia.
- Department of Environment, Water, Heritage and the Arts (2005) Northern Quoll (*Dasyurus hallucatus*) [online]. Available from:
<http://www.environment.gov.au/biodiversity/threatened/species/dasyurus-hallucatus.html>. Accessed 3 December 2008.
- Department of Land and Water Conservation (1999) Groundwater Quality protection Policy. Available online from:
http://www.dnr.nsw.gov.au/water/pdf/nsw_state_groundwater_quality_policy.pdf. Accessed 17 November, 2008.
- 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.
- Government of South Australia (2008) Woma Python: *Aspidites ramsayi*. Available online from:
<http://www.saalnrn.sa.gov.au/LinkClick.aspx?fileticket=Y2jGWY0TLh0=&tabid=822>. Accessed 8 November, 2008.
- Higgins, P.J. and Davies, S.J.J.F (1996) Handbook of Australian, New Zealand and Antarctic Birds. Vol 3: Snipe to Pigeons. Oxford University 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.
- NSW National Parks and Wildlife Service (1999) Flock Bronzewing: *Phaps histrionica* (Gould, 1841). Available online from:
<http://www.environment.nsw.gov.au/resources/nature/tsprofileFlockBronzewing.pdf>. Accessed 8 December 2008.

- 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.
- Van Vreeswyk, A.M.E., Payne, A.L., Hennig, P., and Leighton, K.A. (2004) An Inventory and Condition Survey of the Pilbara Region, Western Australia. Department of Agriculture, Western Australia.
- Western Australian Museum (2008) Faunabase - Western Australian Museum, Queensland Museum and Museum and Art Gallery of NT Collections Databases [online]. Available from: <http://museum.wa.gov.au/faunabase/prod.index.htm>. Accessed 3 July, 2008.

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.