



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 4532/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **Argyle Diamonds Limited**

1.3. Property details

Property: Diamond (Argyle Diamond Mines Joint Venture) Agreement Act 1981, Mining Lease 259SA (AM 70/259)
Local Government Area: Shire of Wyndham-East Kimberley
Colloquial name: Argyle Diamond Mine

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
50		Mechanical Removal	Infrastructure and Operational Maintenance

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 13 October 2011

2. Background

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 for the whole of Western Australia. The vegetation of the application area is broadly mapped as Beard vegetation associations:</p> <p>65 - Grasslands, tall bunch grass savanna, sparse low tree, terminalia; mitchell grass (<i>Astrelba pectinata</i> & spp.);</p> <p>126 - Bare areas; freshwater lakes;</p> <p>808 - Grasslands, curly spinifex, low tree savanna; snappy gum over curly spinifex;</p> <p>819 - Grasslands, tall bunch grass savanna low tree; cabbage gum & silverleaved box over aridista & ribbon grass on sandy plains;</p> <p>820 - Grasslands, high grass savanna sparse low tree; snappy gum (<i>Eucalyptus brevifolia</i>) over upland tall grass & curly spinifex on granite;</p> <p>825 - Grasslands, high grass savanna woodland; cabbage gum & <i>Eucalyptus foelscheana</i> over upland tall grass & curly spinifex on basalt;</p> <p>827 - Hummock grasslands, low tree steppe; terminalia over <i>Triodia wiseana</i> on limestone; and</p> <p>833 - Grasslands, short bunch grass savanna sparse low tree; scattered Snappy Gum over arid short grass on plains (Shepherd, 2009; GIS Database).</p> <p>A flora survey conducted by Matiske (2004), which includes a significant portion of the application area, identified the following vegetation complexes within the application area:</p> <p>Hummock Grasslands</p> <p>HG1 Hummock Grassland of <i>Triodia bitextura</i> and <i>Triodia bynoei</i> with emergent <i>Eucalyptus brevifolia</i>, <i>Corymbia confertiflora</i>, <i>Corymbia opaca</i>, <i>Eucalyptus pruinosa</i>, <i>Bauhinia cunninghamii</i> over <i>Acacia arygraea</i> and <i>Acacia</i></p>	<p>Argyle Diamonds Limited is proposing to clear up to 50 hectares of native vegetation within the application area at a rate of 10 hectares per year for infrastructure and operational maintenance (Argyle Diamonds, 2011). Infrastructure and operational maintenance will include, but is not limited to: track clearing, monitoring site clearance, pipeline facilities access, fenceline maintenance, firebreaks, clearance of vegetation with the potential to block culverts and dam wall vegetation removal.</p> <p>The vegetation and topsoil will be stockpiled for use in rehabilitation.</p>	<p>Completely Degraded: No longer intact; completely/almost completely without native species (Keighery, 1994)</p> <p>To</p> <p>Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery 1994).</p>	<p>The application area is located in the Ord Victoria Plains and Victoria Bonaparte bioregions of Western Australia and is situated approximately 113 kilometres south-west of Kununurra. Vegetation condition has been determined using aerial imagery and the results of a flora survey conducted over the application area by Matiske (2004).</p>

hemignosta;

HG2 Hummock Grassland of *Triodia bitextura* and *Triodia bynoei* with emergent *Corymbia confertiflora*, *Corymbia opaca*, *Eucalyptus brevifolia*, *Eucalyptus pruinosa*, *Bauhinia cunninghamii* and *Terminalia canescens*;

HG3 Hummock Grassland of *Triodia bitextura* and *Triodia bynoei* with emergent denser pockets of *Terminalia canescens* and *Cochlospermum fraseri*, with the occasional *Corymbia confertiflora* and *Eucalyptus brevifolia*;

Woodlands

W1 Low Open Woodland of *Terminalia canescens* with *Corymbia confertiflora*, *Eucalyptus brevifolia*, *Terminalia oblongata* subsp. *volucris* and *Eucalyptus pruinosa* over patches of *Triodia bitextura* and *Heteropogon contortus*;

W2 Low Open Woodland of *Melaleuca minutifolia* and *Eucalyptus pruinosa* over *Triodia bitextura*;

W3 Low Open Woodland of *Eucalyptus brevifolia* over pockets of *Acacia argyraea* and *Eriachne ciliata*;

W4 Open Woodland and Low Open Woodland of *Terminalia platyptera*, *Terminalia arostrata*, *Adansonia gregorii*, *Buchanania obovata* and *Bauhinia cunninghamii*;

W5 Mixture of Open Woodland and Low Open Woodland of *Adansonia gregorii*, *Buchanania obovata*, *Bauhinia cunninghamii* and *Eucalyptus brevifolia* over patches of *Typha domingensis*, *Heteropogon contortus*, *Cenchrus elymoides* and *Chloris truncata*;

W6 Low Open Woodland of *Melaleuca minutifolia* over patches of *Typha domingensis*;

W7 Low Open Woodland of *Bauhinia cunninghamii* and *Eucalyptus pruinosa* over mixed grasses and herbs;

W8 Low Woodland of *Cochlospermum fraseri*, *Eucalyptus brevifolia*, *Eucalyptus pruinosa* and *Corymbia opaca* over *Triodia bitextura* and *Cyperus cunninghamii* subsp. *cunninghamii*;

W9 Low Open Woodland of *Corymbia opaca*, *Eucalyptus brevifolia*, *Eucalyptus pruinosa* and *Cochlospermum fraseri* over *Ptilotus spicatus* subsp. *spicatus*, *Cleome viscosa* and *Phyllanthus maderaspatensis* var. *angustifolia*; and

Sedgelands

S1 Sedgelands of *Typha domingensis* with emergent *Adansonia gregorii*, *Melaleuca viridiflora* and *Lophostemon grandiflora* var. *Riparius*.

3. Assessment of application against Clearing Principles

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

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

The application area occurs predominantly within the Ord (OVP1) subregion of the Ord Victoria Plains. An area of approximately 73 hectares, less than 4% of the application area, lies within the Victoria Bonaparte P1 subregion of the Victoria Bonaparte Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). The Ord subregion is characterised by level to gently undulating plains with scattered hills on Cambrian volcanic and Proterozoic sedimentary rocks; vertosols on plains and predominantly skeletal soils on hills (CALM, 2002). The overall vegetation is grassland with scattered Bloodwoods (*Eucalyptus* sp.) and Snappy Gum (*Eucalyptus brevifolia*) with spinifex and annual grasses (CALM, 2002).

The vegetation within the application area consists of 8 Beard vegetation associations, all of which are common and widespread throughout the Ord Victoria Plains and Victoria Bonaparte bioregions with approximately 100% of the pre-European vegetation extent remaining (Shepherd, 2009; GIS Database). The application area is located in the Northern Botanical Province, within the East Kimberley near the point where three of the four Kimberley Botanical Districts meet (Argyle Diamonds, 2011).

The application area was mapped by Dames and Moore (1982) as Hills Complex vegetation: comprised of Kimberley low tree steppe, frosted Bloodwood steppe woodland, Bloodwood curly spinifex tree savanna, Cotton tree low steppe, Celtis-Pouteria scrub, Halls Creek gum low tree steppe and mixed dwarf shrub steppe.

The vegetation ranges from 'completely degraded' to 'excellent' condition (Keighery, 1994). A total of 206 vascular plant taxa from 124 genera and 51 families were recorded as part of surveys conducted across a large portion of the application area. Botanical studies on the wider Argyle lease area have recorded a total of 466 taxa (Mattiske, 2004). No Declared Rare Flora (DRF) or Priority Flora species have been previously recorded within the operational areas of the minesite (Argyle Diamonds, 2011). A search on the Department of Environment and Conservation Declared Rare and Priority Flora databases revealed no DRF or Priority Flora species that may potentially occur in the application area. No Threatened Ecological Communities or Priority Ecological Communities were recorded or identified within the application area (GIS Database).

A fauna review of the Argyle lease area was undertaken by Bamford Consulting Ecologists in January 2005. The review concluded that the Argyle area is rich in reptile, amphibian and avifauna, with an abundance of waterbirds drawn to the natural riverine systems and artificial water sources associated with the mining operation. A large number of conservation significant species have previously been recorded from the lease area. However, the fauna habitats present within the subregion are common and widespread and fauna assemblages within the Argyle lease area are not likely to be different to that found in similar habitat located elsewhere in the region (Bamford Consulting Ecologists, 2005).

The vegetation communities identified within the application area are typical of the of the Ord Victoria Plains and Victoria Bonaparte bioregions. Argyle Diamonds Limited has applied to clear 50 hectares (10 hectares per annum) in order to conduct infrastructure and operational maintenance of its existing mine assets. The vegetation to be cleared is largely disturbed due to its proximity to existing mine infrastructure and is unlikely to comprise a high level of biological diversity.

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

Methodology Argyle Diamonds (2011)
Bamford Consulting Ecologists (2005)
CALM (2002)
Dames and Moore (1982)
Keighery (1994)
Mattiske (2004)
Shepherd (2009)
GIS Database:
- IBRA WA (Regions - Subregions)
- Pre-European vegetation
- Threatened Ecological Sites Buffered

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

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

Several fauna surveys have been undertaken within the Argyle Diamond Mine lease area, during 1980/1981, 2000 and 2002 (Argyle Diamonds, 2011). In 2005, a general review of the local fauna was undertaken by Bamford Consulting Ecologists (2005). As a result of previous surveys at the Argyle lease, 27 native mammals, 79 reptiles and 19 amphibians and 219 bird species have been recorded. This includes 27 bird species listed under the Japan-Australia Migratory Bird Agreement or China-Australia Migratory Bird Agreement, 24 of which are waterbirds (Bamford Consulting Ecologists, 2005). There are two species of mammals and one species of reptile listed as threatened species under the *Environmental Protection and Biodiversity Conservation Act 1999* or protected under Western Australian legislation that have been recorded on the Argyle lease (Argyle Diamonds, 2011). These are the Water Rat (*Hydromys chrysogaster*), Lakeland Downs Mouse (*Leggadina lakedownesis*) and Freshwater Crocodile (*Crocodylus johnstoni*).

The distribution and abundance of the mammal fauna on the Argyle Lease area is highly seasonally dependent, and the amphibian and reptile fauna of the lease area is extensive with species from both the more arid and wetter northern zones being present. Many of the amphibians and reptiles recorded from the lease area are common to the Spinifex and sorghum grasslands found on the alluvial plains of the region (Bamford Consulting Ecologists, 2005). A high number of waterbird species have previously been recorded from the lease area. The existing natural riverine systems of the local area and 'man-made' tailings storage facility and numerous water storage dams associated with the mining operation provide suitable habitat for waterbird species (Bamford Consulting Ecologists, 2005).

According to Shepherd (2009) approximately 100% of the pre-European vegetation remains within the Ord Victoria Plain and Victoria Bonaparte bioregions. The habitat present within the application area is considered to be widespread within the region. Given the extent of native vegetation remaining in the local area and bioregion, the vegetation to be cleared does not represent a significant ecological linkage in a regional context. The proposed clearing of 50 hectares (10 hectares per annum) is for the purpose of infrastructure and operational maintenance. As vegetation clearing will be associated with areas previously disturbed for Argyle

Diamond mine infrastructure, these areas are not likely to comprise the whole or a part of, or be necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

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

Methodology Argyle Diamonds (2011)
Bamford Consulting Ecologists (2005)
Shepherd (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

According to available databases, there are no records of Declared Rare Flora (DRF) within the application area (GIS Database). A search of the Department of Environment and Conservation's NatureMap database identified no DRF species as occurring within the Argyle Diamond lease (DEC, 2011). Additionally no DRF species have been recorded during flora surveys conducted within the Argyle Diamond lease (Argyle Diamonds, 2011).

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

Methodology Argyle Diamonds (2011)
DEC (2011)
GIS Database:
- Declared Rare and Priority Flora List

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

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

A search of the available databases shows that there are no Threatened Ecological Communities situated within 100 kilometres of the application area (GIS Database).

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

Methodology GIS Database:
- Threatened Ecological Sites Buffered

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

Comments Proposal is not at variance to this Principle

The application area falls within the Ord Victoria Plain and the Victoria Bonaparte IBRA bioregions (GIS Database). Shepherd (2009) reports that approximately 100% of the pre-European vegetation still exists in these bioregions (see table below).

The vegetation within the application area consists of 8 Beard vegetation associations, all of which are common and widespread throughout the Ord Victoria Plains and Victoria Bonaparte bioregions with approximately 100% of the pre-European vegetation extent remaining (Shepherd, 2009; GIS Database). This is more than the 30% threshold level recommended in the National Objectives Targets for Biodiversity Conservation below which species loss appears to accelerate exponentially at an ecosystem level (EPA, 2000).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion - Ord Victoria Plain	38,498	38,498	~100	Least Concern	-
IBRA Bioregion - Victoria Bonaparte	1,871,371	1,865,626	~99.69	Least Concern	-
Beard vegetation associations - State					
65	69,905	69,876	~99.96	Least Concern	0.27
126	210,722	196,839	~93.41	Least Concern	5.18
808	1,168,948	1,168,580	~99.97	Least Concern	0.91
819	58,826	58,826	~100	Least Concern	-
820	59,638	59,638	~100	Least Concern	-
825	77,761	77,680	~99.9	Least Concern	-
827	86,972	86,870	~99.88	Least Concern	56.63
833	38,675	38,675	~100	Least Concern	-
Beard vegetation associations - Bioregion Ord Victoria Plain					
65	37,701	37,701	~100	Least Concern	-
126	100,121	100,121	~100	Least Concern	-
808	687	687	~100	Least Concern	-
819	48,986	48,986	~100	Least Concern	-
820	5,305	5,305	~100	Least Concern	-
825	22,590	22,590	~100	Least Concern	-
827	86,856	86,856	~100	Least Concern	56.71
833	38,498	38,498	~100	Least Concern	-
Beard vegetation associations - Bioregion Victoria Bonaparte					
126	32,173	32,173	~100	Least Concern	14.66
808	34,735	34,735	~100	Least Concern	-

* Shepherd (2009)

** Department of Natural Resources and Environment (2002)

The proposed clearing of 50 hectares (10 hectares per annum) is for the purpose of infrastructure and operational maintenance. As vegetation clearing will be associated with areas which have been previously disturbed and the vegetation is common and widespread within the region it is not considered that the vegetation is likely to be significant as a remnant in an area that has been extensively cleared.

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

Methodology Department of Natural Resources and Environment (2002)
EPA (2000)
Shepherd (2009)
GIS Database:
- IBRA WA (regions - subregions)
- Pre-European Vegetation

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

Comments Proposal is at variance to this Principle

There are numerous minor and major ephemeral drainage lines (GIS Database) which intersect the application area. Matiske (2004) identified one sedgeland vegetation unit (S1) in a survey which covered a portion of the application area. The nearest permanent water course (Bow River) is 7 kilometres south of the application area (GIS Database).

The application area lies entirely within the Ord River catchment, upstream of Lake Argyle which is a RAMSAR listed wetland located 2 kilometres east (GIS Database) of the minesite. The Mine is located at the south eastern end of the Matsu Range of hills that form the headwaters of a number of creeks that ultimately drain north into Lake Argyle. The majority of the drainages are ephemeral with flows restricted largely to the wet season when rainfall allows rapid flows in these areas (Argyle Diamonds, 2011). Argyle Diamonds (2011) have also identified that some of the operational and infrastructure maintenance activities which require clearing will include the removal of vegetation with the potential to block culverts within watercourses and also dam wall vegetation removal.

Given the above, the vegetation under application is considered to be growing in an environment associated with a watercourse or wetland. However, ephemeral drainage lines are common throughout the Ord River catchment and it is unlikely that the clearing of vegetation from these areas will have any significant environmental impacts in a local or regional context.

The proposed clearing of 50 hectares (10 hectares per annum) is for the purpose of infrastructure and operational maintenance. As vegetation clearing will be associated with areas which have been previously disturbed and considering the level of disturbance which already exists within the Argyle Diamond mine lease there are unlikely to be any significant additional environmental impacts upon the nearby Lake Argyle.

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

Methodology Argyle Diamonds (2011)
GIS Database:
- Geodata lakes
- 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 area comprises of the following 8 land systems (GIS Database):

Argyle land system - Gently undulating 'black soil' plain;
Wave Hill land system - Gently undulating stony plains on Basalt;
Dinnabung land system - Gently undulating limestone;
Wickham land system - Rugged plateaux, ridges and hills formed on sedimentary rocks;
Gordon land system - Low hilly to undulating limestone country;
Headley land system - Dissected limestone hills;
Weaber land system - Scattered small areas of rugged sandstone hills, with some gentle lower slopes;
Macphee land system - Undulating sandy granite country; and
O'Donnell land system - Stony undulating country with scattered hills and loamy skeletal soils.

Argyle Diamonds (2011) have identified that the landscape surrounding the Argyle Diamond mine is hilly, with gentle foothills and well defined drainage lines. The clearing permit area is comprised of relatively flat to gently undulating slopes associated with underlying extensively folded and faulted sedimentary units (Argyle Diamonds, 2011). The soils in the Argyle Lease area vary from skeletal to extensive silt and sandy flats (Dames and Moore, 1982).

Given that the application area is extensive, covering over 1900 hectares and a range of land systems and soil types, some parts of the application area may be associated with increased land degradation risks. Where soils are comprised of sand or silt the removal of vegetation may increase the risk of wind or water erosion.

However, the proposed clearing of 50 hectares (10 hectares per annum) is for the purpose of infrastructure and operational maintenance. The areas proposed for clearing are adjacent to or within areas which have been previously disturbed and considering the level of disturbance which already exists within these areas it is unlikely that the proposed clearing would cause significant appreciable land degradation.

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

Argyle Diamonds (2011)
Dames and Moore (1982)
GIS Database:
- Rangeland Land System Mapping

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

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

The proposed application area is not located within any conservation areas (GIS Database). The nearest conservation area is the Purnululu National Park, located approximately 48 kilometres south-east of the application area (GIS Database). Given the distance separating Purnululu National Park and the application area the proposed clearing is not likely to impact the environmental values of the conservation area.

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

Methodology GIS Database:
- DEC Tenure

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

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

The application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database). The nearest permanent water course (Bow River) is 7 kilometres south of the application area (GIS Database).

Argyle Diamonds (2011) have identified that the depth to groundwater across the site is generally 15 metres below the ground surface. The regional direction of groundwater flow is towards the AK1 pit largely due to dewatering influences.

The groundwater in the application area is of marginal salinity (500-1,000 milligrams/Litre Total Dissolved Solids) (GIS Database). The application area occurs within the Ord River catchment, and given the size of the Ord River catchment area (4,526,080 hectares) (GIS Database) in relation to the application area, the clearing of 50 hectares of native vegetation is not likely to deteriorate the quality of surface or underground water.

The application area experiences a dry hot tropical, semi-arid climate with tropical rainfall (CALM, 2002). The application area receives an average annual rainfall of 762.4 millimetres/year with an average annual pan evaporation rate of approximately 2,600-2,800 millimetres/year (BoM, 2011). The application area contains numerous ephemeral drainage lines with flows restricted largely to the wet season when rainfall allows rapid flows in these areas (Argyle Diamonds, 2011). The removal of native vegetation for infrastructure and operational maintenance is not likely to result in significant changes to surface water flows.

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

Methodology Argyle Diamonds (2011)
BoM (2011)
CALM (2002)
GIS Database:
- Geodata, Lakes
- Groundwater Salinity, Statewide
- Hydrographic Catchments - Catchments
- Hydrography, Linear
- Public Drinking Water Source Areas

(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 a dry hot tropical, semi-arid climate with tropical rainfall, where the annual evaporation rate exceeds the annual rainfall (CALM, 2002; BoM, 2011). The application area is located within the Ord River catchment area (4,526,080 hectares) (GIS Database). The proposed clearing of native vegetation is not likely to significantly impact on the drainage characteristics of the catchment or increase the potential for flooding within the application area.

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

Methodology BoM (2011)
CALM (2002)
GIS Database:
- Hydrographic Catchments - Catchments

Planning instrument, Native Title, RIWI Act Licence, EP Act Licence, Works Approval, Previous EPA decision or other matter.

Comments

There are no Native Title claims over the area under application. The mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

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

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

The clearing permit application was advertised on 15 August 2011 by the Department of Mines and Petroleum inviting submissions from the public. One submission was received in relation to this application regarding aboriginal heritage issues. A written response was provided on the matters raised.

Methodology

GIS Database:

- Aboriginal Sites of Significance
- Native Title Claims – Determined by the Federal Court
- Native Title Claims – Registered with the NNTT
- Native Title Claims – Filed at the Federal Court

4. References

- Argyle Diamonds (2011) Lease Clearing for Infrastructure and Operational Maintenance Application supporting documentation, July 2011.
- Bamford Consulting Ecologists (2005) Review of Terrestrial Vertebrate Fauna of the Argyle Diamond Lease and East Kimberley (including impacts of proposed mine expansion near Limestone Creek). Unpublished report prepared for Argyle Diamond Mine Pty Ltd, January 2005.
- BoM (2011) Climate Statistics for Australian Locations. A Search for Climate Statistics for Argyle Aerodrome, Australian Government Bureau of Meteorology, viewed 6 October 2011, http://reg.bom.gov.au/climate/averages/tables/cw_002064.shtml.
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions. Ord Victoria Plains 1 (OVP1 – Ord subregion) Department of Conservation and Land Management, Western Australia.
- Dames and Moore (1982) Environmental Review and Management Programme, Argyle Diamond Project. Unpublished report prepared for Argyle Diamond Mines Pty Ltd, 1982.
- DEC (2011) NatureMap - Mapping Western Australia Biodiversity, Department of Environment and Conservation, viewed 05 October 2011, <<http://naturemap.dec.wa.gov.au>>.
- Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.
- EPA (2000) Environmental protection of native vegetation in Western Australia. Clearing of native vegetation, with particular reference to the agricultural area. Position Statement No. 2. December 2000. Environmental Protection Authority, Western Australia.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Mattiske (2004) Flora and Vegetation Survey, Expansion of Waste Dumps and Area Associated with Underground Expansion near Limestone Creek. Unpublished report prepared for Argyle Diamond Mines Pty Ltd, March, 2004.
- Shepherd, D.P. (2009) Adapted from: Shepherd, D.P., Beeston, G.R., and Hopkins, A.J.M. (2001), Native Vegetation in Western Australia. Technical Report 249. Department of Agriculture Western Australia, South Perth.

5. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government
CALM	Department of Conservation and Land Management (now DEC), Western Australia
DAFWA	Department of Agriculture and Food, Western Australia
DEC	Department of Environment and Conservation, Western Australia
DEH	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
DEP	Department of Environment Protection (now DEC), Western Australia
DIA	Department of Indigenous Affairs
DLI	Department of Land Information, Western Australia

DMP	Department of Mines and Petroleum, Western Australia
DoE	Department of Environment (now DEC), Western Australia
DoIR	Department of Industry and Resources (now DMP), Western Australia
DOLA	Department of Land Administration, Western Australia
DoW	Department of Water
EP Act	Environmental Protection Act 1986, Western Australia
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
RIWI Act	Rights in Water and Irrigation Act 1914, Western Australia
s.17	Section 17 of the Environment Protection Act 1986, Western Australia
TEC	Threatened Ecological Community

Definitions:

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

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

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

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

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

- P1** **Priority One: Taxa with few, poorly known populations on threatened lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P2** **Priority Two: Taxa with few, poorly known populations on conservation lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

- P3** **Priority Three: Taxa with several, poorly known populations, some on conservation lands:** Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P4** **Priority Four: Taxa in need of monitoring:** Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.
- P5** **Priority Five: Taxa in need of monitoring:** Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

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

- EX** **Extinct:** A native species for which there is no reasonable doubt that the last member of the species has died.
- EX(W)** **Extinct in the wild:** A native species which:
 (a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
 (b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
- CR** **Critically Endangered:** A native species which is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
- EN** **Endangered:** A native species which:
 (a) is not critically endangered; and
 (b) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
- VU** **Vulnerable:** A native species which:
 (a) is not critically endangered or endangered; and
 (b) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
- CD** **Conservation Dependent:** A native species which is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.