



1. Application details

1.1. Permit application details

Permit application No.: 2178/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: CEMEX Australia Pty Limited

1.3. Property details

Property: General Purpose Lease 47/47
General Purpose Lease 47/48
General Purpose Lease 47/171
Local Government Area: Shire Of Roebourne
Colloquial name: Nickol Bay Quarry Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
19.3		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 1:250,000 scale for the whole of Western Australia, and are a useful tool to examine the vegetation extent in a regional context. Two Beard vegetation associations are located within the area proposed to be cleared (GIS Database). These are:</p> <p>Vegetation Association 117: Hummock grasslands, grass steppe; soft spinifex, and</p> <p>Vegetation Association 127: Bare areas; mud flats.</p> <p>A flora and vegetation survey was conducted by Umwelt Environmental Consultants (2007b) between the 2nd and 4th of July 2007. The survey identified several vegetation associations within the application area, these were:</p> <p>TtEf: Low open <i>Trianthema tugidifolia</i> shrubland with isolated <i>Eragrostis falcata</i> hummock grassland.</p> <p>AstTp: Low open <i>Acacia synchronicia</i> and <i>Acacia stellaticeps</i> shrubland over <i>Triodia pungens</i> and <i>Triodia angusta</i> hummock grassland.</p> <p>AsyTzTp: Open <i>Acacia synchronicia</i> and <i>Eremophila longifolia</i> shrubland and <i>Trichodesma zeylanicum</i> heathland over hummock (<i>Triodia pungens</i>) and tussock (<i>Cenchrus ciliaris</i>) grassland.</p> <p>DhTp: Low <i>Dolichandrone heterophylla</i> woodland with isolated <i>Hakea lorea</i> and <i>Grevillea pyramidalis</i> subsp. <i>pyramidalis</i> trees over sparse <i>Acacia synchronicia</i> shrubland and <i>Trichodesma zeylanicum</i> heathland over hummock (<i>Triodia pungens</i>) and mixed tussock grassland.</p>	<p>The proposed clearing footprint is made up of two application areas, an area in the west made up of one mining tenement (General Purpose Lease 47/47) and an eastern area made up of two mining tenements (General Purpose Lease 47/171 and General Purpose Lease 47/48).</p> <p>The 19.3 hectares of vegetation proposed to be cleared is required for several purposes. The eastern area (General Purpose Lease 47/48) is proposed to be cleared for on-site accommodation, while General Purpose Lease 47/171 will be used for future expansion of the stockpile area of quarry products. The western application area (General Purpose Lease 47/47) is proposed to be cleared for stage two of stockpiling quarry products (Umwelt Environmental Consultants, 2007a).</p>	<p>Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery 1994)</p>	<p>Umwelt Environmental Consultants (2007b) have noted that there are signs of disturbance in the southern section of the eastern application area (General Purpose Lease 47/171) with vehicle tracks and little vegetative cover sighted. A lot of large <i>Acacia</i> shrubs within vegetation association AsyTzTp were sighted as dead.</p> <p>Three weed species (Buffel Grass, Kapok Bush and Spiked Malvastrum) were identified within the application areas. The most common of these was Buffel Grass which was common near the edge of quarry operations (Umwelt Environmental Consultants, 2007b).</p>

Very Good:
Vegetation structure
altered; obvious
signs of disturbance
(Keighery 1994)

3. Assessment of application against clearing principles

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

Comments

The application area is located approximately 13 kilometres north-west of Karratha, within the Roebourne Interim Bioregional Regionalisation of Australia (IBRA) Subregion (GIS Database). The subregion is described by Kendrick and Stanley (2001) as alluvial and older colluvial coastal and sub-coastal plains with a grass savannah of mixed bunch and hummock grasses, and dwarf shrub steppe of *Acacia stellaticeps* or *A. pyriformis* and *A. inaequilatera*. The dominant land uses of the Roebourne Subregion are grazing - native pastures, aboriginal lands and reserves, conservation and mining (Kendrick and Stanley, 2001).

The application area is located within the Burrup Peninsula which is known for its distinct vegetation types opposed to those of the mainland. The peninsula is also known for its high level of flora endemism (Kendrick and Stanley, 2001). The Burrup Peninsula is a minor centre of endemism for terrestrial gastropods, and is also a fire and evolutionary refuge for flora. There are also intense archaeological values within the region; which include very large rock art sites, some containing thousands of images (Kendrick and Stanley, 2007).

A flora survey of the application area was conducted by Umwelt Environmental Consultants between 2-4 July 2007. The survey identified 62 flora species within the application area, including three weed species: Buffel Grass, kapok Bush and Spiked Malvastrum (Umwelt Environmental Consultants, 2007b). No Declared Rare Flora (DRF) or Priority Flora species were recorded within the application area. Umwelt Environmental Consultants (2007) have stated that the biodiversity values of the application area were relatively high in comparison to the wider Pilbara region, however this is a reflection of the high biodiversity values of the Burrup Peninsula as a whole.

The vegetation condition rating of the application area varied from 'poor' to 'very good' (Umwelt Environmental Consultants, 2007b). The vegetation community named TtEf had a poor condition rating and significant disturbance present, primarily by way of vehicle tracks. This area had plant coverage estimated at 40%. The other vegetation communities within the application generally were in a good condition, with only slight signs of disturbance due to vehicle tracks (Umwelt Environmental Consultants, 2007b).

A fauna survey was undertaken within both clearing areas, during which no conservation significant species were recorded (Umwelt Environmental Consultants, 2007a). Additionally, there were no significant habitat features sighted such as rocky outcrops or water holes in the application area. Umwelt Environmental Consultants (2007a) have stated that the application area does not contain suitable habitat for the known species of threatened fauna on the Burrup Peninsula.

The application area is located within an industrial estate, which is listed under the Burrup and Maitland Industrial Estates Agreement (Umwelt Environmental Consultants, 2007a). There are several industrial businesses in close proximity to the application areas. The presence of this industrial activity is likely to have reduced the biodiversity values of the local area.

Umwelt Environmental Consultants (2007b) have stated that the major forms of disturbance in the application area were vehicle tracks and weeds. This was most evident in General Purpose Lease 47/171, which had numerous active vehicle tracks intersecting the area proposed to be cleared. All other sites surveyed within the application area had vehicle tracks, however, they weren't active. Weeds were most prevalent on the bunds adjacent to the operating quarries, as well as along vehicle tracks, however, there were few weeds observed away from the developed areas (Umwelt Environmental Consultants, 2007b). The proponent will implement the following management measures to minimise the introduction and spread of weeds and control weed species on site:

- Adequate control of weeds prior to revegetation.
- Adequate and timely control of significant environmental weed infestations during the life of the project.
- All heavy earth moving equipment coming onto the site from other areas to be cleaned prior to entry to remove weed seeds and plant pathogens.
- Signage to be provided where appropriate to restrict human and/or vehicles from entering weed infected areas.
- Vehicles are not to leave designated access tracks to prevent vegetation to minimize the spread of weeds.

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

Methodology Kendrick and Stanley (2001).
Umwelt Environmental Consultants (2007a).
Umwelt Environmental Consultants (2007b).
GIS Databases:
- Interim Biogeographic Regionalisation of Australia - EA 18/10/00
- Interim Biogeographic Regionalisation of Australia (subregions) - EA 18/10/00

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

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

A fauna assessment of the application area was undertaken between 2-4 July 2007 (Umwelt Environmental Consultants, 2007a). The fauna survey involved two processes; a desktop survey to gather background information on the target areas, as well as a field survey to verify the findings of the desktop survey.

The desktop survey, which involved a search of the Department of Environment and Conservation's (DEC) Threatened Fauna Database as well as the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* Protected Matters Search Tool, indicated that there were four species listed under the *EPBC Act 1999* and six species listed by the DEC as threatened or priority fauna, which may occur in the application area (Umwelt Environmental Consultants, 2007a). These include: Northern quoll (*Dasyurus hallucatus*), Pilbara leaf-nosed bat (*Rhynonictis aurantius* (Pilbara form)), Olive python (Pilbara subspecies) (*Morelia olivacea barroni*), Black-footed rock wallaby (*Petrogale lateralis*), Pilbara olive python (*Liasis olivaceus barroni*), Peregrine Falcon (*Falco peregrinus*) Little north-western mastiff bat (*Mormopterus loriae cobourgiana*) Ghost bat (*Macroderma gigas*), Western pebble-mound mouse (*Pseudomys chapmani*) and Bush stone-curlew (*Burhinus grallarius*).

Based on habitat preferences and known records of the above species, the most likely to be found within the application area is the Peregrine falcon.

The Peregrine falcon (DEC - Schedule 4) is widespread across Australia including some continental islands but absent from most deserts and the Nullarbor Plain (Johnstone & Storr, 1998). Its habitat consists of areas such as cliffs along coasts, rivers and ranges, and about wooded watercourses and lakes (Johnstone & Storr, 1998). The Peregrine Falcon may potentially utilise the application area for feeding, however, there are large amounts of potential feeding habitat that the Peregrine Falcon can utilise in the local area. Therefore, the vegetation within the application area is not likely to be significant habitat for this species.

There were no conservation significant species identified within the application area during the fauna survey. A habitat assessment of the application area showed that the following habitat was present: flat or slightly undulating low open shrubland, with patches of low open woodland and grassland (Umwelt Environmental Consultants, 2007a). No waterholes, rocky outcrops, or other significant habitat features were observed within the application area. Additionally some of the habitats within the application area were highly disturbed from vehicle tracks and weeds (Umwelt Environmental Consultants, 2007a). Based on the lack of significant habitats for conservation species identified within the application area, it is unlikely the proposed clearing will have any significant impact on significant habitat for fauna.

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

Methodology Johnstone & Storr (1998).
Umwelt Environmental Consultants (2007a).

(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

A flora and vegetation assessment of the application area was completed by Umwelt Environmental Consultants (2007b) between the 2nd and 4th of July, 2007. The assessment involved a desktop review of previous flora surveys of the area, and a reconnaissance survey to verify the findings of the desktop review (Umwelt Environmental Consultants, 2007b).

The desktop review of the application area revealed that two Priority Three Flora species may be present. These were *Terminalia supranitifolia* and *Themeda* sp. '*Hammersley Station*' (Umwelt Environmental Consultants, 2007b). No known Declared Rare Flora (DRF) species were identified as occurring within the application area from the desktop review.

The subsequent reconnaissance survey identified 62 taxa within the application area. This included three weed species - Buffel Grass, Kapok Bush and Spiked Malvastrum (Umwelt Environmental Consultants, 2007b). The majority of species recorded were from the following families; Poaceae (grasses) with 12 taxa, Papilionaceae (peas) with 7 taxa, Mimosaceae (wattles) with 6 taxa and Goodeniaceae with 4 taxa. No known DRF or Priority species were recorded within the application area during the reconnaissance survey (Umwelt Environmental

Consultants, 2007b). Based on the lack of DRF or Priority Flora species identified from the reconnaissance survey, it is unlikely the proposed clearing will significantly impact the conservation status of any known DRF or Priority Flora species.

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

Methodology Umwelt Environmental Consultants (2007b).
GIS Database:
- Declared Rare and Priority Flora List - CALM 01/07/05

(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) within the application areas (GIS Database). There are no known TECs found within the Roebourne synopsis IBRA Subregion (Kendrick & Stanley, 2001). None of the vegetation types identified in the project area are ecological communities at risk, as described in the assessment of the biodiversity values of the Roebourne IBRA Subregion by Kendrick & Stanley (2001). The flora and fauna assessment of the application areas did not identify any significant ecological communities within the area proposed to be cleared (Umwelt Environmental Consultants, 2007b).

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

Methodology Kendrick & Stanley (2001).
Umwelt Environmental Consultants (2007b).
GIS Database:
- Threatened Ecological Communities - CALM

(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 area applied to clear is located within the Pilbara Bioregion (Shepherd, 2001). According to Shepherd (2001) there is approximately 99.9% of Pre-European vegetation remaining within the bioregion. The vegetation of the application area is classified as Beard vegetation association 117 - Hummock grasslands, grass steppe; soft spinifex and Beard vegetation association 127 - Bare areas; mud flats (GIS Database, 2007). Both of these vegetation associations remain at approximately 96% of pre-European extent in the entire state. At the Bioregion level there is approximately 94.5% of Beard vegetation association 117 remaining, while there is approximately 98.5% of Beard vegetation association 127 remaining (Shepherd, 2001). The proposed clearing will not reduce the extent of either of the vegetation associations below current recognised threshold levels. The area proposed to clear (19.3 ha) does not represent a significant remnant of vegetation in an area that has been extensively cleared.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	% of Pre-European area in IUCN Class I-IV Reserves (and current %)
IBRA Bioregion – Pilbara	17,804,163	17,794,650	~ 99.9	Least Concern	6.3
Local Government Roebourne	No information available				
Beard veg assoc. – State					
117	919,751	886,791	~ 96.4	Least Concern	13.1
127	742,653	719,983	~ 96.9	Least Concern	7.4
Beard veg assoc. – Bioregion					
117	74,507	74,410	~ 94.5	Least Concern	11.2
127	180,369	177,714	~ 98.5	Least Concern	0

* Shepherd et al. (2001)

** Department of Natural Resources and Environment (2002)

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

Methodology Department of Natural Resources and Environment (2002).
Shepherd et al., (2001).
GIS Database:
- Interim Biogeographic Regionalisation of Australia - EA 18/10/00
- Pre-European Vegetation - DA 01/01

(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 two minor non-perennial watercourses which traverse the application areas (GIS Database). These watercourses are minor and would only flow during rainfall events. No riparian vegetation was identified from the flora and vegetation survey completed by Umwelt Environmental Consultants (2007b). According to Umwelt Environmental Consultants (2007b) the vegetation of the creek beds was dominated by spinifex, which is common in the region. Photographs of the vegetation within the application area confirm that the vegetation present within the application area is not riparian in nature and is dominated by spinifex.

Based on the above, the proposed clearing is at variance to this Principle. However, the watercourses within the application area are minor and are not habitat for unique vegetation of a riparian nature.

Methodology Umwelt Environmental Consultants (2007b).
GIS Database:
- Hydrography, linear (medium scale, 250k GA)
- Hydrography, linear - DOE 1/2/04
- Geodata, Lakes - GA 28/06/02q

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

Comments **Proposal may be at variance to this Principle**

The application areas are located on a drainage plain between the rocky ranges to the north and the salt flats to the south (Umwelt Environmental Consultants, 2007a). The topography of the drainage plain is slightly undulated, with areas in the north slightly higher than in the south (GIS Database). Runoff is likely to move from areas in the north as sheet flow or along minor incised drainage pathways down gradient towards the salt flats in the south east (Umwelt Environmental Consultants, 2007a).

The top half of the eastern portion of the application area, is located within the Granitic Land System (GIS Database). This system is described as rugged granite hills supporting shrubby hard and soft spinifex grasslands (Van Vreeswyk et al., 2004). There is no soil erosion potential within this land system due to the stony mantle, which provides protection against erosional forces (Van Vreeswyk et al., 2004).

The western portion of the application area, and the southern section of the eastern portion of the application area are located within the Cheerawarra Land System. This land system is described as sandy coastal plains and saline scalds, soft spinifex and buffel grass grasslands (Van Vreeswyk et al., 2004). This particular area within the landscape is described as sandy surfaced plains and has an extreme wind erosion potential if vegetation is depleted. Based on this information it is possible that wind erosion may occur as a result of the proposed clearing.

There are two non-perennial water courses which traverse the application areas (GIS Database). Runoff is likely to flow from the north to south of the application areas into the low lying salt flat (GIS Database). Vegetation lying south of the application area is likely to rely on runoff from the north contained in watercourses and sheets flows. The clearing of 19.3 hectares is likely to alter the direction of runoff, and could result in the starvation of water to vegetation downstream of the application areas. However, CEMEX Australia Pty Ltd, have committed to install diversion bunds around the perimeter of the application areas, which will redistribute runoff downstream back to its original pathways. As a result it is unlikely this vegetation would suffer as a result of the proposed clearing.

Based on the above, the proposed clearing may be at variance to this principle. However, Umwelt Environmental Consultants (2007b) have stated that progressive clearing will be undertaken during the life of the project. Therefore, no significant areas will be subject to erosional forces at any given time. Additionally, in all areas that are to be cleared, a working pad will be installed (made up of gravel) which will reduce the potential for wind erosion.

Methodology Umwelt Environmental Consultants (2007b).
Van Vreeswyk et al., (2004).
GIS Database:
- Topographic Contours, Statewide - DOLA 12/09/02

(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

There is an un-named C-Class reserve located approximately 9.4 kilometres to the north-west of the application area (GIS Database). The C-Class Reserve covers two islands off the coast of Dampier named East Lewis and West Lewis Island respectively. There is approximately 5 kilometres of ocean separating the mainland and the islands (GIS Database). Due to the large distance between the application area and the Reserve, and the small size of the clearing required, there is unlikely to be any significant impacts to the environmental values of this reserve.

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

Methodology GIS Database:
- CALM Managed Lands and Waters - CALM 1/07/05

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

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

The proposal is not located within a Public Drinking Water Supply Area (GIS Database).

During rainfall periods, water in the application areas is likely to move from higher areas in the north, to lower areas situated in the south, as sheetflows or along minor drainage lines (GIS Database). The two areas will be cleared and infrastructure such as camp facilities, stockpiles, etc will be constructed. There is some risk that the proposed clearing activities may cause or increase sedimentation, erosion or turbidity to watercourses on or off site. To ensure the protection of surface water quality, bunds will be constructed around the boundary of the operational areas (Umwelt Environmental Consultants, 2007a). The bunds will divert surface water flows around the operational areas and minimize the risk of suspended sediments being picked up in surface water flows. Therefore stormwater flows across the stockpile areas will be minimised and contamination of downstream surface water flows reduced.

The ground water in the vicinity of the application area is deep (Umwelt Environmental Consultants, 2007a). According to the mining proposal written by Umwelt Environmental Consultants (2007a) groundwater will not be intersected, as a result there is unlikely to be any significant effects on groundwater in the application areas.

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

Methodology Umwelt Environmental Consultants (2007a).
GIS Database:
- Hydrography, linear (medium scale, 250k GA)
- Public Drinking Water Source Areas (PDWSAs) - DOW

(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 is located on a drainage plain between the rocky ranges to the north and the salt flats to the south (Umwelt Environmental Consultants, 2007a). The topography of the drainage plain is slightly undulated, with areas in the north slightly higher than in the south (GIS Database). There are two non-perennial drainage lines which intersect the application areas (GIS Database). Runoff is likely to move from areas in the north as sheet flow or along minor incised drainage lines down gradient towards the salt flats in the south east (Umwelt Environmental Consultants, 2007a).

The annual rainfall of Port Hedland (which includes the application area) varies from 250-450 millimetres per year, and many years without significant rainfall can occur (Bureau of Meteorology, 2007). Most rainfall occurs in summer as a result of scattered thunderstorms and the occasional tropical cyclone. A secondary peak in the monthly rainfall occurs in May as a result of rainfall caused by tropical cloud bands which intermittently affect the area mostly in May and June. The evaporation levels of the application area are approximately 3200 millimetres per year, this is approximately 7 times the amount of rainfall received per year. Based on the drainage patterns of the application area and the high evaporation rates present, there is still the potential for flooding, however the intensity and duration of flooding events are likely to be low.

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

Methodology Bureau of Meteorology (2007).
Umwelt Environmental Consultants (2007).
GIS Database:
- Evapotranspiration, Point Potential
- Hydrography, linear (medium scale, 250k GA)

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

Comments

There is one native title claim in the area under application (WC99_014) (GIS Database, 2007). The mining 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 is one registered Site of Aboriginal Significance located on the northern border of the application area (Site ID 8954) (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Sites of Aboriginal Significance are damaged through the clearing process.

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

Methodology

GIS Databases:

- Aboriginal Sites of Significance - DIA
- Native Title Claims - DLI

4. Assessor's comments

Purpose	Method	Applied area (ha)/ trees	Comment
Mineral Production	Mechanical Removal	19.3	<p>The Clearing Principles have been addressed and the proposed clearing may be at variance to Principle (g), is at variance to Principles (f), is not likely to be at variance to Principles (a), (b), (c), (d), (h), (i), and (j), and is not at variance to Principle (e).</p> <p>Should the permit be granted, it is recommended that conditions be imposed on the permit for the purpose of permit reporting.</p>

5. References

- Bureau of Meteorology (2007) Climate of Port Hedland. URL: http://www.bom.gov.au/weather/wa/port_hedland/climate.shtml
- 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.
- Johnstone, R.E., & Storr, G.M. (1998) Handbook of Western Australian Birds. Western Australian Museum. Perth.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Kendrick, P & Stanley, F (2001) Pilbara 4 (PIL4 - Roebourne synopsis) Subregional description and biodiversity values, dated August 2001. In: "A biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002". Report published by the Department of Conservation and Land Management, Perth, Western Australia.
- 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.
- Umwelt Environmental Consultants (2007a) Nickol Bay Quarry Mining Proposal General purpose Leases Development - Conducted in September 2007. Unpublished report for Readymix. Perth, Western Australia.
- Umwelt Environmental Consultants (2007b) Nickol Bay Quarry Flora and Vegetation General purpose Leases Development - Conducted in September 2007. Unpublished report for Readymix. Perth, Western Australia.
- Van Vreeswyk, A.M.E., Payne, A.L., Leighton, K.A., and Hennig, P. (2004) Technical Bulletin No 92 an inventory and condition survey of the Pilbara region, Western Australia. Department of Agriculture, Government of Western Australia.

6. Glossary

Acronyms:

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

DIA	Department of Indigenous Affairs
DLI	Department of Land Information, Western Australia.
DoE	Department of Environment, Western Australia.
DoIR	Department of Industry and Resources, Western Australia.
DOLA	Department of Land Administration, Western Australia.
DoW	Department of Water
EP Act	Environment Protection Act 1986, Western Australia.
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
GIS	Geographical Information System.
IBRA	Interim Biogeographic Regionalisation for Australia.
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
RIWI	Rights in Water and Irrigation Act 1914, Western Australia.
s.17	Section 17 of the Environment Protection Act 1986, Western Australia.
TECs	Threatened Ecological Communities.

Definitions:

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

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

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

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

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

- P1** **Priority One: Taxa with few, poorly known populations on threatened lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P2** **Priority Two: Taxa with few, poorly known populations on conservation lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P3** **Priority Three: Taxa with several, poorly known populations, some on conservation lands:** Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under

immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

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

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

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

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

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

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

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

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

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