



# Clearing Permit Decision Report

## 1. Application details

### 1.1. Permit application details

Permit application No.: 5793/1  
Permit type: Purpose Permit

### 1.2. Proponent details

Proponent's name: **Mobile Concreting Solutions Pty Ltd**

### 1.3. Property details

Property: Miscellaneous Licence 45/328  
Local Government Area: Town of Port Hedland  
Colloquial name: Indee Sand Quarry

### 1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
10		Mechanical Removal	Haul Road Construction

### 1.5. Decision on application

Decision on Permit Application: Grant  
Decision Date: 17 October 2013

## 2. Site Information

### 2.1. Existing environment and information

#### 2.1.1. Description of the native vegetation under application

**Vegetation Description** Beard vegetation associations have been mapped for the whole of Western Australia and are useful to look at vegetation in a regional context. The following Beard vegetation associations are located within the application area (GIS Database):

93: Hummock grasslands, shrub steppe; kanji over soft spinifex,

619: Medium woodland; river gum (*Eucalyptus camaldulensis*), and

647: Hummock grasslands, dwarf-shrub steppe; *Acacia translucens* over soft spinifex.

A Level 1 Flora and Vegetation Survey was conducted within the application area on 30 May – 1 June 2012 by Astron Environmental Services (AES) (AES, 2013a). Five vegetation communities were described by AES following this survey:

#### River Levee with red sands and loams

**R1i:** *Acacia tumida* with *A. trachycarpa* closed tall shrubland over *Triumfetta propinqua* / *Corchorus incanus* subs. *incanus* over *Eriachne obtusa*, *Eragrostis eriopoda*, *Aristida hygrometrica* and *Triodia schinzii*;

#### River Flood Plain and Outer River Bank with deep red alluvial sands

**R3i:** *Corymbia hemersleyana* open woodland over *Acacia inaequilatera*/ *A. tumida* open tall shrubland over *Triodia lanigera* hummock grassland with some *T. epactia*;

#### River Bed and Inner Banks with washed sands, stones and gravels

**R5i:** *Melaleuca argentea* scattered to open low woodland over very scattered *Crotalaria cunninghamii*, *Petalostylislabicheoides*, *Cajanus cinereus*;

**R5ii:** *Melaleuca argentea* scattered tall trees over mixed *Acacia trachycarpa*, *M. lasiandra*, *A. pyrifolia* var *morrisonii* mixed open shrubland; and

**R5iii:** *Eucalyptus victrix* open low woodland over *Acacia trachycarpa* tall shrubland with mixed *A. coriacea*, *A. orthocarpa*, *A. tumida*, *Grevillea wickhamii* over very scattered *Triodia longiceps*, *T. lanigera*, *T. epactica* hummocks and sedges *Cyperus vaginatus*, *C. blakeanus*

**Clearing Description** Indee Sand Quarry. Mobile Concreting Solutions Pty Ltd has applied to clear 10 hectares of native vegetation within a total boundary of approximately 10 hectares, for the purpose of haul road construction (GIS Database). The application area is located approximately 50 kilometres south – south west of Port Hedland, in the Town of Port Hedland (GIS Database).

**Vegetation Condition** Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (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

##### Proposal may be at variance to this Principle

A Level 1 Flora and Vegetation Survey was conducted within the application area on 30 May – 1 June 2012 by Astron Environmental Services (AES) (AES, 2013a). The survey consisted of a desktop assessment of potential fauna occurrence, and a field survey in order to map vegetation types, conduct a targeted search for conservation significant flora, and assess the condition of vegetation within the application area (AES, 2013a).

The application is located within the Pilbara (PIL) Interim Biogeographic Regionalisation of Australia (IBRA) region and the Chichester (PIL1) subregion (GIS Database). Within the western end of the application area, a small portion also lies within the Roebourne (PIL4) subregion (GIS Database). The Pilbara region represents a transitional zone between semi-arid and tropical climates (Kendrick, 2001). The Chichester IBRA subregion consists of undulating granite and basalt plains, which support both a shrub steppe dominated by *Acacia inaequilatera* over *Triodia wiseana* hummock grasslands, and a tree steppe within ranges dominated by *Eucalyptus leucophloia* (Kendrick and McKenzie, 2001). In contrast, the Roebourne subregion is comprised of coastal and sub-coastal plains which support grass savannah and a dwarf shrub steppe of *Acacia stellaticeps* or *A. pyrifolia* and *A. inaequilatera* (Kendrick and Stanley, 2001).

The vegetation within the application area is mapped as belonging to Beard associations 93, 619 and 647. Among them, vegetation association 619 has a high reservation priority (Kendrick and McKenzie, 2001) and only ~40% of this association is included within DePAW managed lands (Government of Western Australia, 2013). AES (2013a) also described five vegetation communities present, including:

R1i: *Acacia tumida* with *A. trachycarpa* closed tall shrubland over *Triumfetta propinqua* / *Corchorus incanus* subs. *incanus* over *Eriachne obtuse*, *Eragrostis eriopoda*, *Aristida hygrometrica* and *Triodia schinzii*;

R3i: *Corymbia hemersleyana* open woodland over *Acacia inaequilatera* / *A. tumida* open tall shrubland over *Triodia lanigera* hummock grassland with some *T. epactia*;

R5i: *Melaleuca argentea* scattered to open low woodland over very scattered *Crotalaria cunninghamii*, *Petalostylislabicheoides*, *Cajanus cinereus*;

R5ii: *Melaleuca argentea* scattered tall trees over mixed *Acacia trachycarpa*, *M. lasiandra*, *A. pyrifolia* var *morrisonii* mixed open shrubland; and

R5iii: *Eucalyptus victrix* open low woodland over *Acacia trachycarpa* tall shrubland with mixed *A. coriacea*, *A. orthocarpa*, *A. tumida*, *Grevillea wickhamii* over very scattered *Triodia longiceps*, *T. lanigera*, *T. epactica* hummocks and sedges *Cyperus vaginatus*, *C. blakeanus*.

No known Threatened Ecological Communities (TECs) occur within the application area (GIS Database) and none were recorded during the flora and vegetation survey (AES, 2013a). The nearest Priority Ecological Community (PEC) lies 67 kilometres west of the application area and is a Horseflat land system of the Roebourne Plains (GIS Database).

The flora and vegetation survey (AES, 2013a) included both the application area and the tenement M45/1232 directly adjacent to the application area. Across these areas, the survey recorded a total of 109 taxa from 32 families and 66 genera (AES, 2013a). Three weed species (*Aerva javanica* - Kapok Bush, *Cenchrus ciliaris* - Buffel Grass and *Cynodon dactylon* - Couch Grass) were identified to occur within the application area (AES, 2013a). Although all three weed species are highly invasive, their abundance is significantly limited within the application area which portrays the 'excellent' (Keighery, 1994) vegetation condition description applied to the area (AES, 2013a). Invasive flora species can decrease the biodiversity value of an area, as they out-compete native vegetation for available resources, contribute to land degradation and increase the frequency and intensity of fires (DEC, 2011). Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

Following a targeted search effort for Threatened or Priority flora species, *Abutilon pritzelianum* (Priority 1) was identified as present within the application area (AES, 2013a). *A. pritzelianum* is a shrub which grows to 1- 1.5 metres in height upon orange to brown sands (Western Australian Herbarium, 2013). Comparatively little is known about this species. Florabase (Western Australian Herbarium, 2013) reports 21 records of this species and NatureMap (DEC, 2013) reports 22 records within the state. Other locations of this species include Carnarvon and the across the Roebourne IBRA subregion (DEC, 2013). An individual plant was identified at the north- eastern end of the proposed clearing, and will be directly impacted. This is not expected to influence the conservation status of this species.

According to NatureMap (DEC, 2013), 18 mammal, 69 avian, 49 reptile and six invertebrate species have been recorded within a 20 kilometre radius of the application area. These included *Dasyercus blythi* (Brush-tailed Mulgara; Priority 4), *Dasyurus hallucatus* (Northern Quoll; Schedule 1), *Macroderma gigas* (Ghost Bat;

Priority 4), *Pseudomys chapmani* (Western Pebble-mound Mouse; Priority 4), *Aspidites ramsayi* (Woma; Schedule 4), *Liasis olivaceus subsp. barroni* (Pilbara Olive Python; Schedule 1), and a number of migratory birds (protected under International Agreement). Each of these species have the potential to occur within the application area.

Given the abundance of birdlife observed and the number of conservation significant species potentially occurring within the application area, the proposed clearing may be at variance to this Principle.

**Methodology** AES (2013a)  
DEC (2011)  
DEC (2013)  
Government of Western Australia (2013)  
Keighery (1994)  
Kendrick (2001)  
Kendrick and Mckenzie (2001)  
Kendrick and Stanley (2001)  
Western Australian Herbarium (2013)  
GIS Database:  
- IBRA WA (regions – subregions)  
- 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**  
A flora and vegetation assessment conducted by AES (2013a) identified five fauna habitats within the application area. These included:

- i. River bed,
- ii. Inner river bank and raised river bed,
- iii. River floodplain and outer river bank,
- iv. Levee with red sands and loams, and
- v. Level sandy loamy plain with some scalds.

All habitats were in excellent condition (Keighery, 1994), with little to no weed invasion (AES, 2013a). Additionally, the flora and vegetation survey conducted by AES (2013a) noted an abundance of birdlife and numerous diggings along the river banks, purportedly dug out by a large reptile species.

A large proportion of the application area is covered by the Abydos Plain- Chichester-93 vegetation association (GIS Database). NatureMap (DEC, 2013), reported six conservation- significant species as having been recorded within a 20 kilometre radius of the proposed clearing. These include *Dasyercus blythi* (Brush-tailed Mulgara; Priority 4), *Dasyurus hallucatus* (Northern Quoll; Schedule 1), *Macroderma gigas* (Ghost Bat; Priority 4), *Pseudomys chapmani* (Western Pebble-mound Mouse; Priority 4), *Aspidites ramsayi* (Woma; Schedule 4), and *Liasis olivaceus subsp. barroni* (Pilbara Olive Python; Schedule 1). All of these species (except for possibly the Northern Quoll) would potentially use the habitat within the application area, and in particular two of these (the Mulgara and Greater Bilby) are known to partly rely on the Abydos Plain- Chichester-93 vegetation association on sandy substrate, which exists within the proposed clearing (Kendrick and Mckenzie, 2001).

While the fauna habitat present within the application area evidently supports a wide range of vertebrate taxa, the availability of this habitat elsewhere is not limited (AES, 2013a; GIS Database) and the application area may therefore not represent critical habitat for fauna dispersal or foraging activity.

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

**Methodology** AES (2013a)  
DEC (2013)  
Keighery (1994)  
Kendrick and Mckenzie (2001)  
GIS Database:  
- Pre- European Vegetation  
- Yule 1.4M Orthomosaic – Landgate 2002

**(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**  
The flora and vegetation search conducted by AES (2013a) on 30 May – 1 June 2012 did not identify any Threatened flora within the application area. Similarly, no Threatened flora were reported by available databases within a 20 kilometre radius of the proposed clearing (DEC, 2013; GIS Database).

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

**Methodology** AES (2013a)  
 DEC (2013)  
 GIS Database:  
 - Threatened and Priority Flora

**(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**  
 According to available databases, there are no known Threatened Ecological Communities (TECs) within the application area (GIS Database). The nearest known TEC is a Themeda Grassland, located approximately 180 kilometres south-west of the application area (GIS Database).  
 The flora and vegetation survey conducted by AES (2013a) did not record the presence of any TECs.

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

**Methodology** AES (2013a)  
 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 Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion, in which approximately 99.58% of the pre-European vegetation remains (see table) (Government of Western Australia, 2013; GIS Database).  
 The vegetation within the application area has been mapped as Beard vegetation associations 93, 619 and 647 (GIS Database). Over 90% of these Beard vegetation associations remain at both a state and bioregional level (Government of Western Australia, 2013). Therefore, the area proposed to be cleared does not represent a significant remnant of native vegetation within an area that has been extensively cleared. Based on aerial imagery, the vegetation within the application area is neither a remnant itself nor does it form part of any remnants within the local area (GIS Database).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in DEC Managed Lands
IBRA Bioregion – Pilbara	17,808,657	17,733,584	~99.58	Least Concern	8.37
Beard veg assoc. – State					
93	3,044,310	3,040,641	~99.88	Least Concern	1.96
619	119,374	118,239	~99.05	Least Concern	0.20
647	195,861	191,711	~97.88	Least Concern	0.00
Beard veg assoc. – Bioregion					
93	3,042,114	3,038,472	~99.88	Least Concern	1.96
619	118,920	118,117	~99.32	Least Concern	0.20
647	195,860	191,711	~97.88	Least Concern	0.00

\* Government of Western Australia (2013)  
 \*\* Department of Natural Resources and Environment (2002)

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

**Methodology** Government of Western Australia (2013)  
 Department of Natural Resources and Environment (2002)  
 GIS Database:  
 - IBRA WA (regions – subregions)  
 - Pre- European Vegetation  
 - Yule 1.4m Orthomosaic - Landgate 2002

**(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**  
 Mobile Concreting Solutions proposes to clear approximately 1.2 hectares of native vegetation within Turner

River for the purpose of haul road construction (GIS Database). A review of aerial imagery (GIS Database) and the flora and vegetation survey conducted by AES (2013a) indicate that vegetation growing in association with this watercourse is riparian in nature.

The construction of the haul road will require the removal of the following riparian vegetation units (AES, 2013a):

- i. R1i (River Levee; *Acacia tumida* with *A. trachycarpa* closed tall shrubland over *Triumfetta propinqua* / *Corchorus incanus* subs. *incanus* over *Eriachne obtuse*, *Eragrostis eriopoda*, *Aristida hygrometrica* and *Triodia schinzii*),
- ii. R3i (Flood Plain; *Corymbia hemersleyana* open woodland over *Acacia inaequilatera*/ *A. tumida* open tall shrubland over *Triodia lanigera* hummock grassland with some *T. epactia*),
- iii. R5i (River Bed; *Melaleuca argentea* scattered to open low woodland over very scattered *Crotalaria cunninghamii*, *Petalostylislabicheoides*, *Cajanus cinereus*),
- iv. R5ii (River Bed; *Melaleuca argentea* scattered tall trees over mixed *Acacia trachycarpa*, *M. lasiandra*, *A. pyrifolia* var *morrisonii* mixed open shrubland), and
- v. R5iii (River Bed; *Eucalyptus victrix* open low woodland over *Acacia trachycarpa* tall shrubland with mixed *A. coriacea*, *A. orthocarpa*, *A. tumida*, *Grevillea wickhamii* over very scattered *Triodia longiceps*, *T. lanigera*, *T. epactica* hummocks and sedges *Cyperus vaginatus*, *C. blakeanus*)

AES (2013a) noted an unusually sparse population of the weeds *Cenchrus ciliaris* (Buffel Grass) and *Aerva javanica* (Kapok Bush) compared to vegetation growing elsewhere along the Turner River. The vegetation growing within this section of the application area is therefore in considerably better condition than other riparian vegetation found in the region. Potential impacts to riparian vegetation as a result of the proposed clearing may be minimised by the implementation of a watercourse management condition. AES (2013a) also recommends the removal of *Aerva javanica* where possible, in order to reduce the opportunity for this invasive species to spread within the immediate vicinity.

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

**Methodology** AES (2013a)  
GIS Database:  
- Hydrography – Linear  
- Yule 1.4m Orthomosaic - Landgate 2002

**(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 area occurs across two land systems (GIS Database). Approximately half of the proposed clearing lies within the Mallina land system, while the remainder falls within the River land system and is partly covered by a river bed unit (GIS Database). The Mallina land system consists of sandy alluvial plains of soft (and occasionally hard) spinifex grasslands (Van Vreeswyk et al., 2004). Much of this land system has suffered little erosion. This notwithstanding, the extent of the application area which lies within the Mallina land system according to available databases (GIS Database) has been mapped by AES (2013a) to comprise the broad vegetation formation R3i: river flood plain with deep red alluvial soils. These plains are highly susceptible to erosive impacts following the removal of vegetation cover (Van Vreeswyk et al., 2004).

The River land system consists of major rivers and flood plains, which support grassy eucalypt woodlands, tussock grasslands and soft spinifex grasslands (Van Vreeswyk et al., 2004). At present, little of this land system suffers from erosion (Van Vreeswyk et al., 2004). However, erosion is highly likely following the clearing of native vegetation, such as that proposed under this permit (Van Vreeswyk et al., 2004).

The haul road will be constructed as a widening of the existing seasonal track along the river bed, which is stabilised by rock armouring (AES, 2013b). Mobile Concreting Solutions has committed to conduct all clearing and stabilise river banks prior to the wet season (AES, 2013b). Furthermore, the road will be stabilised using hard rock armour products, and revetments will be inspected and maintained regularly (AES, 2013b).

Given the nature of the clearing, there may be potential for erosion to occur across both land systems. Mobile Concreting Solutions have committed to stabilisation techniques to address this. In addition, potential impacts from erosion as a result of the proposed clearing may be minimised by the implementation of a staged clearing condition.

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

**Methodology** AES (2013a)  
AES (2013b)  
Van Vreeswyk et al (2004)  
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 application area does not lie within any conservation areas of the Department of Parks and Wildlife managed lands (GIS Database). The nearest conservation area is the Mungarooka Range Nature Reserve, vested in the Conservation Commission of Western Australia (GIS Database). It is located approximately 69 kilometres south west of the application area (GIS Database). From this distance, the proposed clearing is not likely to impact the environmental values of the proposed 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 does not occur within a Public Drinking Water Source Area (PDWSA), however it is located within the proclaimed Pilbara groundwater area under the *Rights in Water and Irrigation Act 1914* (GIS Database). Any groundwater extraction and/or taking or diversion of surface water for the purposes other than domestic and/or stock watering is subject to licence by the Department of Water. The proposed clearing falls within the River land system, and crosses the Turner River (GIS Database). This land is part of the Turner River Catchment in the Port Hedland Coast Basin (GIS Database). The Turner River is a major, non-perennial watercourse which flows into the Indian Ocean (GIS Database), and prior to 1980 supplied water to Port Hedland (Haig, 2009).

The clearing of vegetation from the Turner River has the potential to destabilise soils, causing sedimentation and turbidity within this watercourse. However, Haig (2009) suggests that (within the alluvial aquifer of the Lower Turner River) river alluvium may be recharged naturally during high-magnitude river flow events. Therefore, if a similar situation occurs upstream, the transport of sediment may not fall outside of the natural processes of this river system. Nonetheless, sedimentation of this watercourse due to insufficient stabilisation of cleared land during wet seasons should be avoided. Mitigating measures to ensure soil stability are addressed under Principle (g).

Groundwater salinity in the local area is estimated to be between 1,000 – 3,000 milligrams/Litre Total Dissolved Solids (TDS), which is considered brackish (GIS Database). The proposed clearing activity is not likely to significantly alter salinity levels within the application area.

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

**Methodology** Haig (2009)  
GIS Database:  
- Groundwater Salinity, Statewide  
- Hydrographic Catchments - Catchments  
- Hydrography – Linear  
- Public Drinking Water Source Areas (PDWSAs)  
- Rangeland Land System Mapping  
- RIWI Act, Groundwater 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**

Mean annual rainfall in the Town of Port Hedland is estimated at 320 millimetres (BoM, 2013). As part of the application, Mobile Concreting Solutions proposes to clear native vegetation across the Turner River for the purpose of haul road construction. This river is seasonally inundated, and Port Hedland experiences periods of high rainfall and occasional cyclones over the months December – March, which can cause the river to flood (Haig, 2009; AES, 2013a; BoM, 2013). The clearing of 10 hectares, including 1.2 hectares of riparian vegetation is unlikely to cause or increase the frequency or intensity of flooding events.

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

**Methodology** AES (2013a)  
BoM (2013)  
Haig (2009)

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

### Comments

There is one native title claim over the area under application (GIS Database). The claim (WC1999/003) has been registered with the Native Title Tribunal on behalf of the claimant group (GIS Database). However, 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*.

According to available databases, there is one registered Aboriginal Site 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 Regulation (formerly 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 23 September 2013 by the Department of Mines and Petroleum inviting submissions from the public. There was one submission received raising no objections.

### Methodology

GIS Database:  
- Aboriginal Sites of Significance  
- Native Title Claims – Registered with the NNTT

## 4. References

- AES (2013a) Indee Sand Quarry Level 1 Flora and Vegetation Survey. Unpublished Report for Mobile Concreting Solutions Pty Ltd.
- AES (2013b) Further information provided to the assessing officer by Astron Environmental Services on 9 October 2013.
- BoM (2013) Climate Statistics for Australian Locations. A Search for Climate Statistics for Paraburdoo, Australian Government Bureau of Meteorology, [http://www.bom.gov.au/climate/averages/tables/cw\\_004032.shtml](http://www.bom.gov.au/climate/averages/tables/cw_004032.shtml), viewed September 2013.
- DEC (2011) Invasive Plant Prioritization, Department of Environment and Conversation, Perth.
- DEC (2013) NatureMap: Mapping Western Australia's Biodiversity, DEC, <http://naturemap.dec.wa.gov.au/default.aspx>, viewed September 2013.
- 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 Western Australia (2013) 2012 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of October 2012. WA Department of Environment and Conservation, Perth.
- Haig, T (2009) The Pilbara coast water study. Department of Water, Hydrogeological record series, Report HG34, 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. (2001) Pilbara 3 (PIL3 – Hamersley Subregion). In A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002 (eds J. E. May & N. L. McKenzie). Department of Conservation and Land Management, WA.
- Kendrick, P. and McKenzie, N (2001) Pilbara (PIL1 – Chichester Subregion). In A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002 (eds J. E. May & N. L. McKenzie). Department of Conservation and Land Management, WA.
- Kendrick, P. and Stanley, F (2001) Pilbara 4 (PIL4 – Roebourne Subregion). In A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002 (eds J. E. May & N. L. McKenzie). Department of Conservation and Land Management, WA.
- Van Vreeswyk, A.M.E, Payne, A.L., Leighton, K.A., and Hennig, P. (2004) An inventory and condition survey of the Pilbara region, Western Australia, Department of Agriculture Technical Bulletin No. 92, December 2004.
- Western Australian Herbarium (2013) Florabase - The Western Australian Flora. Department of Environment and Conservation. Available online at <http://florabase.dec.wa.gov.au/>, viewed September 2013.

## 5. Glossary

### Acronyms:

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

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