



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 5647/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Quarry Park Pty Ltd

1.3. Property details

Property: Mining Lease 08/487
Miscellaneous Licence 08/71
Local Government Area: Shire of Ashburton
Colloquial name: Ashburton River North Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
55		Mechanical Removal	Mineral Production

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 15 August 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 entirety of Western Australia. Two Beard vegetation associations have been mapped within the application area (GIS Database):

- 589: Mosaic: Short bunch grassland - savanna / grass plain (Pilbara) / Hummock grasslands, grass steppe; soft spinifex; and
- 676: Cape Yannare: Succulent steppe; samphire.

Newland Environmental conducted a flora and vegetation survey over the application area in December 2011. A total of eight vegetation associations were identified in the application area, as well as three other areas where no vegetation occurred (Newland Environmental, 2013). The vegetation associations identified in the application area are listed below;

- Vegetation association 1: Scattered Shrubs of *Acacia tetragonophylla* (1.5 – 2m by 0 – 2%) over tussock grassland of *Cenchrus ciliaris* (0.3 – 0.4m by 30 – 60%) with very open hummock grassland of *Triodia epactia* (0.3 – 0.5m by 0 - 20%) on sand plains;
- Vegetation association 2: Open shrubland of *Acacia tetragonophylla* (1 – 2.5m by 0 - 4%) and *Acacia synchronicia* (1m by 0-1%) over open tussock grassland of *Cenchrus ciliaris* (0.3 – 0.4 m by 10 to 30%) with hummock grassland of *Triodia epactia* (0.3 – 0.4m by 10 to 40%) on sand plains;
- Vegetation association 3: Low scattered shrubs to low open shrubland of *Tecticornia indica* subsp. *leiostachya* (0.4m by 0 - 2%), *Tecticornia halocnemoides* subsp. *tenuis* (1m by 0 - 1%) and *Sclerolaena bicornis* (0.5m by 0 - 1%) with very open tussock grassland of *Iseilema vaginiflorum* (0.3 – 0.4 m by 0 - 3%), *Chloris pumilio* (0.3m by 0 - 2%) and *Cenchrus ciliaris* (0.3 - 0.5m by 0 - 2%) on scalded claypans;
- Vegetation association 4: Scattered low trees to low open woodland of *Eucalyptus victrix* (8-10m by 1 - 3%) over open shrubland of *Acacia tetragonophylla* (1.5m by 0 - 2%), *Vachellia farnesiana* (0.5 - 1m by 0-1%) and *Parkinsonia aculeata* (3m by 0-1%) over open tussock grassland of *Chloris pumilio* (0.3m by 0 – 20%), *Cenchrus ciliaris* (0.3m by 0-2%) and *Cenchrus setiger* (0.3m by 0 - 2%) on flood plains;
- Vegetation association 5: Scattered shrubs of *Acacia tetragonophylla* (1-1.5m by 1%), *Acacia synchronicia* (1m by 0 - 1%) and *Scaevola spinescens* (1m by 0 - 1%) over open tussock grassland of *Chloris pumilio* (0.5m by 2%), *Cenchrus ciliaris* (0.3m by 1%), *Eragrostis falcata* (0.3m by 2 - 20%), *Iseilema vaginiflorum* (0.3m by 0 - 15%) on flood plains;
- Vegetation association 6: Shrubland of *Tecticornia halocnemoides* subsp. *tenuis* (1.2m by 20 – 25%) and *Scaevola spinescens* (1.2m by 0 - 1%) over very open tussock grassland of *Cenchrus ciliaris* (0.3m by 0 - 1%), *Chloris pumilio* (0.4 – 0.5m by 1 - 3%) and *Sporobolus mitchellii* (0.3m by <1-2%) on flood plains;

- Vegetation association 7: Scattered low trees to low open woodland of *Erythrina vespertilio* (8m by 0 - 2%) *Eucalyptus victrix* (7m by 0 - 5%) and *Eucalyptus camaldulensis* (4-5 m by 1%) over high shrubland to open scrub of *Parkinsonia aculeata* (4 - 5m by 5 - 80%) and *Vachellia farnesiana* (2-3m by 0 - 2%) over scattered shrubs to open shrubland of *Ricinus communis* (2m by 0 - 10%) and *Acacia sclerosperma* subsp. *sclerosperma* (1m by <1%) over open tussock grassland of *Cenchrus ciliaris* (0.4 – 0.6m by 5 – 40%) and *Sporobolus mitchellii* (0.2 - 0.3m by 0 - 10%) on river banks; and
- Vegetation association 8: Low open woodland of *Avicennia marina* (4m by 5%) and *Eucalyptus victrix* (5m by <1%) over open scrub of *Parkinsonia aculeata* (4m by 60%) and *Vachellia farnesiana* (2m by <1%) over open tussock grassland of *Sporobolus mitchellii* (0.3m by 7%) on river banks.

Clearing Description	Quarry Park Pty Ltd has applied to clear 55 hectares of native vegetation within an application area of approximately 103 hectares for the purposes of mineral production. Clearing will be undertaken to facilitate the creation of a sand mining operation footprint including access roads, administration areas and stockpile areas. The sand mining operation will be established within and adjacent to the Ashburton River, located approximately 22 kilometres southwest of the town of Onslow. The vegetation will be cleared using mechanised equipment.
Vegetation Condition	Very Good: vegetation structure altered, obvious signs of disturbance (Keighery, 1994); to Completely Degraded: the structure of the vegetation is no longer intact and the area is completely or almost completely without native species (Keighery, 1994).
Comment	Vegetation condition was assessed by botanists from Newland Environmental (2013). The vegetation condition was assessed using a scale based on Trudgen (1988). The vegetation condition recorded within the application area was converted to the corresponding conditions from the Keighery (1994) scale.

3. Assessment of application against clearing principles

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

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

The application area is situated within the Cape Range subregion (CAR01) of the Interim Biogeographic Regionalisation for Australia (IBRA) (GIS Database). This subregion is characterised as a mosaic of saline alluvial plains with samphire and saltbush low shrublands, Bowgada low woodland on sandy ridges and plains, Snakewood scrub on clay flats, and tree to shrub steppe over hummock grasslands on and between red sand dune fields (CALM, 2002).

Quarry Park Pty Ltd commissioned Rapallo to undertake a Level 1 fauna survey of the application area in 2011 (Rapallo, 2012). During this survey clay pan, floodplain, mudflat, sand plain and riparian fauna habitats were recorded in the application area (Rapallo, 2012). Mudflats are highly productive ecosystems which support a diverse range of invertebrate and vertebrate communities (Rapallo, 2012). The presence of mudflats within the application area appears to have contributed to the application area's high levels of bird diversity (Rapallo, 2012). The sand plain, riparian, floodplain and clay pan habitats all showed signs of degradation owing to the application area's use for pastoral grazing; with heavy grazing, prominent weed infestations and erosion visible within the application area (Rapallo, 2012; Newland Environmental, 2013). These habitats may have been highly productive once, however it is likely that the application area's faunal diversity has been adversely impacted by habitat degradation resulting from pastoral activities (Rapallo, 2012). Eight migratory and marine bird species were recorded in the application area during the fauna survey (Rapallo, 2012). No other fauna species of conservation significance were recorded in the application area during the survey (Rapallo, 2012).

Newland Environmental conducted a flora and vegetation survey of the application area in 2011. Eight vegetation associations were mapped in the application area during this survey (Newland Environmental, 2013). Six out of the eight mapped vegetation associations (or approximately 88% of the mapped vegetation) were found to be in good to completely degraded condition (Newland Environmental, 2013). The degraded condition of much of the mapped vegetation was attributed to the application areas history of pastoral land use with prominent weed infestations, low levels of native flora species diversity, high levels of grazing and erosion scalding apparent in the application area (Newland Environmental, 2013). Only two of the mapped vegetation associations were found to be in very good condition (Newland Environmental, 2013). A total of 66 vascular flora taxa from 51 genera and 16 families were recorded during the flora survey (Newland Environmental, 2013). Poaceae was the dominant family in terms of taxa and genera numbers with Fabaceae, Chenopodiaceae and Asteraceae the subdominant families. A total of 66 vascular flora taxa recorded within a 103 hectare area was not considered unusual when the generally degraded condition of the site and the time of year the survey was conducted (the dry season) were considered (Newland Environmental, 2013). Eight weed species were recorded in the application area: Buffel Grass (*Cenchrus ciliaris*), Birdwood Grass (*Cenchrus setiger*), Pie Melon (*Citrullus lanatus*), Spiked Malvastrum (*Malvastrum americanum*), Parkinsonia (*Parkinsonia aculeata*), Stinking Passion Flower (*Passiflora foetida*), Castor Oil Plant (*Ricinus communis*) and Mimosa Bush (*Vachellia farnesiana*) (Newland Environmental, 2013). Both Buffel Grass and Parkinsonia occurred in dense infestations within the application area (Newland Environmental, 2013).

No Threatened flora species, Priority flora species, Threatened Ecological Communities (TEC's) or Priority Ecological Communities (PEC's) were recorded within the application area (Newland Environmental, 2013). A

weed dominated mangrove community (vegetation association 8) was recorded as occupying a small portion of the application area (0.42 hectares). The condition of this community was deemed to be degraded on the basis of the small representation of the mangrove species *Avicennia marina* within this community (5% cover) and the significant representation of *Parksonia* within the community (60% cover). The application area is situated within a Guideline 1 Management Area (Area 4: Ashburton River Delta) as designated within the Environmental Protection Authorities (EPA) *Guidance Statement No. 1: Protection of Tropical Arid Zone Mangroves Along the Pilbara Coastline* (EPA, 2001). Impacts to this vegetation association should therefore be avoided despite its degraded nature. Potential impacts to this vegetation association can be avoided through the implementation of a permit condition not authorising clearing within this community. Two potential range extensions were observed in the application area: *Urochloa occidentalis* subsp. *ciliata* and *Sclerolaena recurvicauspis* (Newland Environmental, 2013).

Based on the above, it is not likely that the area proposed to be cleared constitutes an area of high biological diversity in a regional context. Therefore the proposed clearing is not likely to be at variance to this Principle.

Methodology CALM (2002)
Newland Environmental (2013)
Rapallo (2012)
GIS Database
-IBRA WA (Regions – Sub Regions).

(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.

No targeted fauna surveys have been conducted within the application area. A Level 1 fauna survey consisting of a desktop search for fauna species previously recorded in the application area and surrounds along with a fauna habitat assessment was undertaken by Rapallo in 2011 (Rapallo, 2012). The application area is generally devoid of the typical unique or specialised fauna habitats associated with conservation significant fauna species (Quarry Park Pty Ltd, 2013). In addition, it was anticipated that the degraded nature of much of the application areas fauna habitats had adversely impacted the faunal species diversity of the application area (Rapallo, 2012). The mudflat habitat which was identified in the application area appeared to contribute to the areas high bird species diversity and was noted as being suitable foraging habitat for a number of migratory marine bird species (Rapallo, 2012). This habitat was recorded in the river bed and as this area is not vegetated, will not be cleared as part of the proposed clearing activities.

The desktop search determined that 26 fauna species of conservation significance had been recorded within 100 kilometres of the application area (Rapallo, 2012). However, due to the habitat types present within the application area and their generally poor condition the conservation significant fauna species most likely to occur in the application area are marine and migratory bird species and the Australian Bustard (*Ardeotis australis*) (Rapallo, 2012). These species are capable of leaving areas undergoing disturbance and the habitat within the application area is not likely to be significant for these species.

As the fauna habitats of the application area appear to have been degraded by pastoral activities, it is unlikely the application area constitutes significant fauna habitat. Based on the above, the proposed clearing is not likely to be at variance to this Principle.

Methodology Quarry Park Pty Ltd (2013)
Rapallo (2012)

(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 known records of Threatened flora in the local area (20 kilometre radius) (GIS Database). Newland Environmental conducted a flora survey of the application area in December 2011. No Threatened flora species were recorded within the application area (Newland Environmental, 2013). Two Threatened flora species are known to occur in the Pilbara region of Western Australia; *Lepidium catapycnon* and *Thryptomene wittweri*. *Lepidium catapycnon* occurs within skeletal soils on hillsides and *Thryptomene wittweri* occurs in skeletal red stony soils, breakaways and stony creek beds (Western Australian Herbarium, 2013). Neither of these habitats appear to be present in the application area. Therefore, the application area does not appear to constitute significant habitat for Threatened flora.

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

Methodology Newland Environmental 2013
Western Australian Herbarium (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.

A review of available databases determined that the application area does not exist within a known Threatened Ecological Community (TEC) (GIS Database). The nearest known TEC, the Camerons Cave Troglitic Community, occurs approximately 86 kilometres west southwest of the application area (GIS Database). No vegetation associations recorded in the application area during the flora and vegetation survey were identified as a TEC (Newland Environmental, 2013). Therefore, the proposed clearing is not expected to result in adverse impacts to any TEC.

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

Methodology Newland Environmental (2013)
GIS Database
-Threatened Ecological Sites

(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 is situated within the Carnarvon IBRA region and contained within two Beard vegetation associations; 589 and 676. Both Beard vegetation associations retain more than 98% of their pre-European extent for the Carnarvon IBRA bioregion (see table below). Hence, the vegetation in the application area does not represent a significant remnant of vegetation within an area that has been extensively cleared.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in DEC Managed Land
IBRA Bioregion – Carnarvon	8,382,890.4	8,360,803.3	~99.7	Least Concern	3.6
Beard veg assoc. – State					
589	807,698.6	802,713.4	~99.4	Least Concern	1.6
676	2,063,413.9	1,963,894.8	~95.2	Least Concern	3.6
Beard veg assoc. – Bioregion					
589	78,100.8	77,834.9	~99.7	Least Concern	0
676	51,983.5	51,232.6	~98.6	Least Concern	6.4

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

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

Comments Proposal is at variance to this Principle.

The applicant is proposing to clear 55 hectares of vegetation for the purposes of sand mining within the Ashburton River. The Ashburton River is approximately 240 kilometres in length with its upper reaches extending into the central Hamersley Ranges (Quarry Park Pty Ltd, 2013). The Ashburton River contains water for most of the year within Mining Lease 08/487 due to the occurrence of the estuarine or littoral environment within the area (Quarry Park Pty Ltd, 2013). River flows are often associated with cyclonic or massive rainfall

events that can result in broad flood plains extending well past the river bed (Quarry Park Pty Ltd, 2013).

The vegetation which will be cleared for the administration, processing and stockpile areas is not considered to be growing in association with the watercourse, since this vegetation is associated with the sand plain environment adjacent to the Ashburton River (Quarry Park Pty Ltd, 2013). However, riparian vegetation on the river banks and flood plains adjacent to the river will be cleared to provide access to the sand resource (Quarry Park Pty Ltd, 2013). Therefore, the proposed clearing is at variance to this Principle.

The proponent has proposed to clear access roads and haul roads through vegetation associations 4 and 7 to provide access to the river bed resource. Vegetation association 4 was assigned a condition rating of good by Newland Environmental (2013) due to impacts to this vegetation association from pastoral activities and the presence of weed species within this vegetation association. Vegetation association 7 was assigned a condition rating of completely degraded by Newland Environmental (2013) due to impacts to this vegetation association from pastoral activities and the presence of large weed infestations within this vegetation association.

The proposed disturbance to vegetation associations 4 and 7 is limited to the clearing of haul roads and access tracks to provide access to the sand resource. In addition, both vegetation associations were considered to be degraded to some extent. Therefore, it is considered unlikely that the proposed clearing activities will result in a significant environmental impact to the Ashburton River or riparian vegetation communities associated with this river.

Methodology Newland Environmental (2013)
Quarry Park Pty Ltd (2013)

(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 is located within the Onslow land system (GIS Database). The Onslow land system is described as consisting of sand plains, dunes and clay plains supporting soft spinifex grasslands and minor tussock grasslands (Van Vreeswyk et al, 2004). The Onslow land system is susceptible to erosion (Van Vreeswyk et al, 2004).

The clearing of 29.17 hectares of vegetation will be required to support the establishment of the sand mining footprint (Quarry Park Pty Ltd, 2013). The remaining 25.83 hectares consists of sand resource located within the river bed which is not vegetated (Quarry Park Pty Ltd, 2013). Given this land systems susceptibility to erosion and the existing erosion scalding in the application area, the proposed clearing activities could lead to further erosion within the application area, particularly during heavy rainfall events. Rehabilitation of the cleared areas at the completion of mining should minimise the risk of soil erosion in the long term. Potential impacts from erosion may be minimised by the implementation of a soil management condition.

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

Methodology Quarry Park Pty Ltd (2013)
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 is not located within a conservation area (GIS Database). The application area is located within Red Book area 9.8; Coastal Region Exmouth Gulf to Mary Anne Islands (GIS Database). This Red Book area was originally demarcated in the belief that this area may provide a supply of nutrients to the adjacent marine ecosystem as well as being a nursery area for fisheries (EPA, 1975). It is considered unlikely that the proposed clearing activities would adversely impact the supply of nutrients to marine ecosystems or adversely impact nursery areas for fisheries.

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

Methodology EPA (1975)
GIS Database
-Clearing Regulations – Environmentally Sensitive Areas
-Clearing Regulations – Schedule One Areas
-Threatened Ecological Sites

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

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

There are no Public Drinking Water Source Areas (PDWSA) within or in close proximity to the application area. The closest PDWSA to the application area is the priority one Cane River Water Reserve, situated approximately 40 kilometres to the east of the application area (GIS Database). As the proposed clearing activities are surficial in nature, it is not anticipated they will result in adverse impacts to the quality of any groundwater reserves underlying the application area.

Surface water flows within the Ashburton River are associated with significant rainfall events and cyclonic conditions (Quarry Park Pty Ltd, 2013). During these episodes it is likely the water within the Ashburton River will carry a significant load of sediment and debris. While the areas cleared adjacent to the river to facilitate the sand mining operation could contribute additional sediment and eroded soil material to the Ashburton River, it is unlikely that the quality of water flowing within the Ashburton River would be adversely impacted by the proposed clearing. In addition, the sand mining operation will be temporary in nature and the cleared areas will require rehabilitation at the end of the mining operations life, ensuring any increase in the sediment load carried by the Ashburton River as a result of the sand mining operation will not be long term in nature.

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

Methodology Quarry Park Pty Ltd (2013)
GIS Database
-Public Drinking Water Source Areas (PDWSAs)

(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 within and adjacent to the Ashburton River, a large watercourse that flows into the Indian Ocean approximately 3 kilometres downstream from the application area. Surface water flows within the Ashburton River are associated with significant rainfall events and cyclonic activity that can result in broad flood plains extending past the riverbed (Quarry Park Pty Ltd, 2013). Hence, the Ashburton River and its surrounding environment are already prone to flooding during these large rainfall events and it is not anticipated that the proposed clearing will increase the incidence or intensity of flooding in the local area or the surrounding region.

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

Methodology Quarry Park Pty Ltd (2013)

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

Comments

There is one Native Title Claim (WC99/45) over the area under application (GIS Database). This claim has been registered with the National Native Title Tribunal on behalf of the claimant group. However, the 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*.

A survey of the application area by Deep Woods Surveys (WA) Pty Ltd (2012) identified two sites of Aboriginal heritage significance within the application area. It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no sites of Aboriginal heritage 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 application area is situated within a Guideline 1 Management Area (Area 4: Ashburton River Delta) as defined within *EPA Guidance Statement No.1: Protection of Tropical Arid Zone Mangroves along the Pilbara Coastline* (EPA, 2001). Impacts to the mangrove vegetation association identified in the application area should therefore be avoided despite the degraded nature of this vegetation association. A condition prohibiting clearing within this community has been placed on the clearing permit.

This clearing permit application was advertised on 24 June 2013 inviting submissions from the public. Two submissions were received. The first submission, received on 16 July 2013, objected to the grant of the clearing permit on the grounds that the proposed clearing will encroach on the Ashburton River, the banks of the river

and its immediate environs. A response to this submission was provided by the Department on 22 July 2013.

The second submission was received on 26 July 2013. This submission dealt with the potential impact of sand mining on the Ashburton River's sediment load and the potential for the reduction of the rivers sediment load to cause incision and erosion impacts downstream of sand mining areas. Downstream erosion and incision impacts caused by sand mining are beyond the scope of this assessment and will be considered during the assessment of other mining related approvals applicable to this project.

Methodology Deep Woods Surveys (WA) Pty Ltd (2012)
EPA (2001)
GIS Database
-Native Title Claims Determined by the Federal Court

4. References

- Deep Woods Surveys WA Pty Ltd (2012) Report on the Aboriginal Heritage Survey of the Onslow Resources Ltd Ashburton River and Onslow Road Leases (G08/80, L08/70, L08/71, M08/475, M08/487, M08/488, and M08/489), Onslow, Western Australia.
- Department of Conservation and Land Management (2002) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions.
- 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.
- Environmental Protection Authority (1975) Conservation reserves for Western Australia, as recommended by the Environmental Protection Authority 1975. Systems 4, 8, 9, 10, 11, 12.
- Environmental Protection Authority (2001) Guidance Statement No.1; Protection of tropical arid zone mangroves along the Pilbara coastline.
- 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.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Newland Environmental (2013) Flora and Vegetation Survey for the Ashburton River North Project on M08/487 and L08/71.
- Quarry Park Pty Ltd (2013) Supporting Information for a Native Vegetation Clearing Permit Application; Purpose Permit Ashburton River North Project on M08/487 and L08/71.
- Rapallo (2012) Level 1 Fauna Survey of the Ashburton River North Project Area for Onslow Resources Ltd.
- Van Vreeswyk, A.M.E.; Payne, A.L.; Leighton, K.A.; Hennig, P. (2004) An inventory and condition survey of the Pilbara Region, Western Australia, Technical Bulletin No. 92 Department of Agriculture Western Australia, South Perth.
- Western Australian Herbarium (2012) Florabase - The Western Australian Flora. Department of Parks and Wildlife. <<http://florabase.dpaw.wa.gov.au/>> Accessed July 2013.

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.

