



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 5153/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Hamersley Iron Pty Ltd

1.3. Property details

Property: *Iron Ore (Hamersley Range) Agreement Act 1963, Mineral Lease 246SA (AML 70/246); Iron Ore (Channar Joint Venture) Agreement Act 1987, Special Lease for Mining Operations 3116/11553 (Document 1 163654 I), Lot 132 on Deposited Plan 243064; Iron Ore (Hamersley Range) Agreement Act 1963, Special Lease for Mining Operations 3114/937, Easement L478326*

Local Government Area: Shire of Ashburton
Colloquial name: Turee Creek Pipeline Upgrade Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
90		Mechanical Removal	Installation of water supply pipeline

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 20 September 2012

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. Two Beard vegetation associations have been mapped within the application area:

Beard vegetation association 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana*; and **Beard vegetation association 181:** Shrublands; mulga & snakewood scrub (Government of Western Australia, 2011; GIS Database).

Rio Tinto (2012) conducted flora and vegetation survey of the application area. The biological review identified and mapped 12 vegetation types associated with three landform types:

Vegetation of Hills and Slopes

H1 – Scattered low trees of *Acacia pruinocarpa* and *Grevillea berryana* over scattered tall shrubs of *Acacia fuscaneura* and *Acacia tetragonophylla* over low open shrubland of *Eremophila fraseri* subsp. *fraseri*, *Eremophila jucunda* subsp. *pulcherrima*, *Eremophila phyllopoda* subsp. *oblique* and *Senna stricta* over open hummock grassland of *Triodia epactia*;

H2 – Low open woodland – scattered tall shrubs of *Acacia fuscaneura*, *Acacia rhodophloia* and *Grevillea berryana* over scattered shrubs of *Acacia tetragonophylla* over low open shrubland of *Eremophila phyllopoda* subsp. *oblique*, *Eremophila fraseri* subsp. *fraseri*, *Eremophila jucunda* subsp. *pulcherrima* and *Senna stricta*; and

H3 – Tall open shrubland of *Acacia bivenosa*, *Acacia wanyu* and *Acacia tetragonophylla* over low open shrubland of *Eremophila cuneifolia*, *Senna stricta* and *Senna artemisioides* subsp. *oligophylla* over open hummock grassland of *Triodia wiseana* and *Triodia angusta*.

Vegetation of Flats and Undulating Slopes

F1 – Low woodland of *Acacia citrinoviridis* with *Acacia fuscaneura* over tall open shrubland of *Acacia wanyu*, *Acacia citrinoviridis* and *Acacia tetragonophylla* over scattered low shrubs of *Ptilotus obovatus*;

F2 – Low open woodland – tall open shrubland of *Acacia citrinoviridis* and *Acacia fuscaneura* over scattered tall shrubs of *Acacia tetragonophylla* over scattered low shrubs of *Eremophila jucunda* subsp. *pulcherrima*, *Eremophila phyllopoda* subsp. *obliqua* and *Ptilotus obovatus* var. *obovatus* over open hummock grassland of *Triodia epactia*;

F3 – Low open woodland – tall open shrubland of *Acacia fuscaneura* over tall open shrubland of *Acacia wanyu* and *Acacia tetragonophylla* over open shrubland of *Eremophila phyllopoda* subsp. *obliqua*, *Senna stricta* and *Eremophila cuneifolia* over scattered low shrubs of *Ptilotus obovatus* var. *obovatus*; and

F4 – Tall open shrubland of *Acacia xiphophylla* and *Acacia synchronica*, *Acacia fuscaneura* and *Acacia tetragonophylla* over open shrubland of *Senna stricta*, *Eremophila cuneifolia* and *senna artemisioides* subsp. *oligophylla*.

Vegetation of Flowlines and Waterbodies

D1 – Scattered trees of *Eucalyptus victrix* over low open woodland of *Acacia citrinoviridis* over tall shrubland of *Acacia citrinoviridis* and *Acacia pyrifolia* var. *pyrifolia* over scattered low shrubs of *Tephrosia rosea* and very open tussock grassland of *Cenchrus ciliaris*;

D2 – Low open woodland – tall open shrubland of *Acacia fusca* with *Acacia citrinoviridis*, *Acacia aptaneura* and *Acacia pruinocarpa* over open shrubland of *Acacia wanyu* and *Acacia tetragonophylla* over open hummock grassland of *Triodia epactia*;

D3 – Scattered low trees of *Acacia citrinoviridis* over tall shrubland of *Acacia citrinoviridis*, *Acacia wanyu*, *Acacia tetragonophylla* over open hummock grassland of *Triodia epactia*;

D4 – Tall shrubland of *Acacia bivenosa*, *Acacia tetragonophylla* and *Acacia wanyu* over open hummock grassland of *Triodia wiseana* and *Triodia epactia*; and

D5 – Scattered tall shrubs of *Acacia citrinoviridis* and *Acacia pyrifolia* var. *pyrifolia* with *Acacia tetragonophylla* over tussock grassland of *Cenchrus ciliaris* and *Eragrostis tenellula* over very open herbland of *Goodenia lamprosperma* and *marsilea hirsuta*.

Previously Cleared Land

CL – Previously cleared vegetation

Clearing Description	<p>Hammersley Iron Pty Ltd is proposing to clear up to 90 hectares of native vegetation within a larger application area of 203 hectares for the Turee Creek Pipeline Upgrade Project. The clearing of vegetation is required for the installation of a water pipeline and associated infrastructure.</p> <p>The vegetation will be cleared using a dozer, blade down. The vegetation and topsoil will be stockpiled separately for use in rehabilitation.</p>
Vegetation Condition	<p>Completely Degraded: No longer intact; completely/almost completely without native species (Keighery, 1994);</p> <p>To:</p> <p>Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery, 1994).</p>
Comment	<p>The application area is located in the Hammersley subregion of Western Australia and is situated approximately 10 kilometres south of the Paraburdoo town site (GIS Database).</p> <p>The vegetation condition was derived from a vegetation survey conducted by Rio Tinto (2012).</p>

3. Assessment of application against clearing principles

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

Comments	<p>Proposal is not likely to be at variance to this Principle</p> <p>The application areas occur within the Hammersley subregion of the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). This subregion is characterised by mountainous area of Proterozoic sedimentary ranges and plateaux, dissected by gorges. Mulga low woodland over bunch grasses on fine textured soils in valley floors, and <i>Eucalyptus leucophloia</i> over <i>Triodia brizoides</i> on skeletal soils of the ranges (CALM, 2002).</p> <p>Rio Tinto (2012) conducted flora and vegetation survey of the application area from 20 to 24 March 2012. The flora searches identified a total of 195 vascular plant taxa from 101 genera and 43 families within the application area (Rio Tinto, 2012). Rio Tinto (2012) state that the application area has moderate species richness and the application area does not support a high diversity of flora or vegetation units which may be important for the locality or the subregion. The flora and vegetation survey (Rio Tinto, 2012) identified 12 vegetation communities associated with three landform types within the application area. The condition of the vegetation types were classified from 'very good' to 'completely degraded' (Keighery, 1994; GIS Database).</p> <p>Vegetation type D5 is thought to be a shallow water body associated with previous earthworks (i.e. anthropogenic) that has filled with water after the wet season (Rio Tinto, 2012). All vegetation types besides D5 are well represented outside the application area, which is consistent with recent botanical reports in nearby areas (Ecologia, 2011; Mattiske, 2011; Pilbara Flora, 2011; Rio Tinto, 2010).</p> <p>There were two Priority Flora species recorded within the application area (Rio Tinto, 2012). A search on the Department of Environment and Conservation's Threatened and Priority Flora databases revealed no Threatened Flora species and seven Priority Flora species that may potentially occur in the application area (DEC, 2012). Rio Tinto (2012) recorded <i>Hibiscus</i> sp. Canga (Priority 1) from ten locations within the application area. Rio Tinto (2012) state that this species has previously been referred to as <i>Hibiscus haynaldii</i> and <i>Hibiscus</i> sp. (aff. <i>haynaldii</i>) from previous botanical reports within the region (Biota, 2009; Morgan, 2012; Rio Tinto, 2010). The species occurs in flowlines and rocky gullies which are not restricted within the application area and are common throughout the region and appears to be spread across the Eastern Range, Channar, Western Range and Turee Syncline region (Rio Tinto, 2012). This species will be avoided by Hammersley Iron Pty Ltd's clearing activities where possible (Rio Tinto, 2012). A Priority 3 species <i>Goodenia</i> sp. East Pilbara was recorded at 24 locations from one calcrete hill in the central section of the application area and 349 individuals were surveyed within the application area (Rio Tinto, 2012). Hammersley Iron Pty Ltd has designated the entire population as an 'environmentally sensitive area' on the Pilbara Iron GIS system will avoid these identified populations where possible (Rio Tinto, 2012). The clearing of 90 hectares of native vegetation will not</p>
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impact the conservation significance of these flora species.

There are no Threatened Flora species, Threatened Ecological Communities or Priority Ecological Communities recorded within the application area (GIS Database).

Six species of weed were identified during the survey (Rio Tinto, 2012). Weeds have the potential to significantly change the dynamics of a natural ecosystem and lower the biodiversity of an area. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

There were three faunal habitats identified within the application area. All of the habitats within the application area are considered to be common and widespread within the subregion and faunal assemblages are unlikely to be different to that found in similar habitat located elsewhere in the region (Rio Tinto, 2012). The clearing of 90 hectares of native vegetation within a 203 hectare application area is unlikely to have a significant impact on a regional and local context.

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

Methodology Biota (2009)
CALM (2002)
DEC (2012)
Ecologia (2011)
Keighery (1994)
Mattiske (2011)
Morgan (2012)
Pilbara Flora (2011)
Rio Tinto (2010)
Rio Tinto (2012)
GIS Database:
- IBRA WA (Regions - Subregions)
- Pre-European vegetation
- Threatened Ecological Sites Buffered

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

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

There were three broad fauna habitat types recorded within the survey area by Rio Tinto (2012);

1. Hill slopes;
2. Plains; and
3. Drainage lines.

Rio Tinto (2012) identified the vegetation condition to be 'completely degraded' to 'very good' (Keighery, 1994). The landforms and habitat found within the application area is considered as being well represented in the Pilbara bioregion (Rio Tinto, 2012). The application area contains the drainage area habitats that are considered ecologically significant. The drainage line associated with vegetation type D5 is likely to provide important habitat for native fauna, and maybe considered 'core habitat' for several native fauna species (Rio Tinto, 2012). Impacts upon this area should be avoided, where possible. No other significant fauna habitats were observed within the application area. Potential impacts to riparian vegetation may be minimised through the implementation of a vegetation management condition. Hamersley Iron Pty Ltd estimate that only 0.04 hectares of the D5 vegetation type associated with the drainage area habitat will be disturbed (Rio Tinto, 2012). Therefore, it is unlikely that any species of conservation significance will be significantly impacted by the clearing of 0.04 hectares of the D5 vegetation type native vegetation in the application area.

Ecologia (2011) conducted a baseline vertebrate fauna survey adjacent to the application area during July 2011. There were 10 mammals, 41 birds and eight reptiles recorded within the application area. Of these species, three species of conservation significance were identified within the application area; the Pilbara Olive Python (*Liasis olivaceus* subsp. *barroni*), the Rainbow Bee-eater (*Merops ornatus*), and the Star Finch (*Neochmia ruficauda*) (Ecologia, 2011). Both the Rainbow Bee-eater and Star Finch are highly mobile species and are most likely to use the application area for foraging as part of a larger territory area (Ecologia, 2011). The Pilbara Olive Python prefers escarpments, gorges and water holes surrounded by spinifex (Tutt et al., 2004; DSEWPaC, 2012), faunal habitats which are not represented within the application area (Rio Tinto, 2012; GIS Database). The habitat present within the application area is not considered significant habitat for these species (Rio Tinto, 2012; GIS Database). The proposed clearing of 90 hectares of native vegetation is not likely to impact critical feeding or breeding habitat for any conservation significant fauna species as the application area does not contain significant habitat for the potential species.

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

Methodology DSEWPaC (2012)

Ecologia (2011)
Rio Tinto (2012)
Tutt et al (2004)
GIS Database:
- Paraburdoo 50cm Orthomosaic - Landgate 2004

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

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

According to available databases, there are no records of Threatened Flora within the application area (GIS Database). A search of the Department of Environment and Conservation's Threatened and Priority Flora databases identified no Threatened Flora species as occurring within a 20 kilometre radius of the application area (DEC, 2012).

Rio Tinto (2012) conducted flora and vegetation survey of the application area between 20 and 24 March 2012. No Threatened Flora was recorded within the survey area.

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

Methodology DEC (2012)
Rio Tinto (2012)
GIS Database:
- Threatened and Priority Flora List

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

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

A search of the available databases shows that there are no Threatened Ecological Communities situated within 50 kilometres of the application area (GIS Database).

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

Methodology GIS Database
- Threatened Ecological Sites Buffered

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

Comments Proposal is not at variance to this Principle

The application area falls within the Pilbara IBRA bioregion (GIS Database). The vegetation within the application area is recorded as:

Beard vegetation association 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana*; and

Beard vegetation association 181: Shrublands; mulga & snakewood scrub (Government of Western Australia, 2011; GIS Database).

According to the Government of Western Australia (2011), Beard vegetation associations 82 and 181 retain approximately 99% of their pre-European extent. The local area has been extensively cleared, however the area proposed to be cleared is not a significant remnant of native vegetation.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion - Pilbara	17,804,427	17,729,352	~99.58	Least Concern	6.32
Beard vegetation associations - State					
82	2,565,901	2,553,217	~99.51	Least Concern	10.24
181	1,697,291	1,695,241	~99.88	Least Concern	2.39
Beard vegetation associations - Bioregion					
82	2,563,583	2,550,899	~99.51	Least Concern	10.25
181	65,090	63,204	~97.10	Least Concern	4.86

* Government of Western Australia (2011)

** Department of Natural Resources and Environment (2002)

Methodology Based on the above, the proposed clearing is not at variance to this Principle.
 Department of Natural Resources and Environment (2002)
 Government of Western Australia (2011)
 GIS Database:
 - IBRA WA (regions - subregions)
 - Pre-European Vegetation

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

Comments Proposal is at variance to this Principle

The application area is dissected by small ephemeral watercourses that run after significant rainfall events, as is typical of the Pilbara region (Rio Tinto, 2012; GIS Database). There are five riparian vegetation types mapped within the application area; D1, D2, D3, D4 and D5 (Rio Tinto, 2012). The flora species associated with vegetation types F2 and F3 also contain species which are consistent with riparian type vegetation (DEC, 2012, Rio Tinto, 2012). The condition of the riparian vegetation types are classified as 'completely degraded' to 'very good' (Keighery, 1994; GIS Database).

The application area intersects a small portion of a creek in the eastern section, which represent major surface drainage features (GIS Database). The vegetation types D1, D2, D3, D4, D5, F2 and F3 associated with the drainage lines support habitats where numerous species may be restricted, including phreatophytic species such as *Eucalyptus victrix* (Rio Tinto, 2012). These vegetation units are susceptible to degradation from weed infestation, cattle grazing and trampling pressures (Rio Tinto, 2012). The proposed clearing is likely to have some impact to the drainage vegetation and Hamersley Iron Pty Ltd will minimise disturbance where possible (Rio Tinto, 2012). The drainage line associated with vegetation type D5 is likely to provide important habitat for native fauna, and maybe considered 'core habitat' for several native fauna species (Rio Tinto, 2012). Hamersley Iron Pty Ltd estimate that only 0.04 hectares of the D5 vegetation type associated with the drainage area habitat will be disturbed (Rio Tinto, 2012). To minimise disturbance to drainage flow patterns, there may be a requirement to install appropriate culvers and drainage structures in order to maintain flows along creeklines. Provided disturbance to riparian habitats is avoided or minimised where possible, and strict weed hygiene procedures are followed, the proposed works are not expected to substantially impact these vegetation units. Potential impacts to riparian vegetation may be minimised through the implementation of a vegetation management condition.

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

Methodology DEC (2012)
 Keighery (1994)
 Rio Tinto (2012)
 GIS Database:
 - Geodata, Lakes
 - Hydrography, Linear

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

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

The application area is within the Platform and Table land systems (GIS Database).

The Platform land system is described as dissected slopes and raised plains supporting hard spinifex grasslands. The vegetation on this system is not preferred by livestock and is of very little use for pastoralism. The system is not susceptible to erosion (Van Vreeswyk et al., 2004).

The Table land system is described as low calcrete plateaux, mesas and lower plains supporting mulga and cassia shrublands and minor spinifex grasslands. The vegetation on the system includes low shrubs which are moderately preferred by grazing animals and are prone to decline if overgrazed. The system is generally not susceptible to erosion (Van Vreeswyk et al., 2004).

The removal of 90 hectares of native vegetation within a 203 hectare application area is unlikely to result in water-logging, acidification, salinisation or deep subsoil compaction, and significant erosion was not observed within the application area despite localised clearing (Rio Tinto, 2012).

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

Methodology Van Vreeswyk et al. (2004)
GIS Database:
- Rangeland 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 any conservation area (GIS Database). The nearest conservation area is Karijini National Park, located approximately 20 kilometres north-east of the application area (GIS Database).

Given the distance of the application area from Karijini National Park, the proposed clearing is not likely to provide a significant ecological linkage or fauna movement corridor and is not likely to impact the environmental values of the conservation area.

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

Methodology GIS Database:
- DEC Tenure

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

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

The application area is not located within a Public Drinking Water Source Area (GIS Database). The application areas are 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.

Several drainage tracts transect the application areas (GIS Database). The drainage patterns in the surrounding area have been impacted by existing railway activities and infrastructure. These drainage tracts are dry for most of the year and only flow and hold surface water for short durations following significant rainfall events (CALM, 2002).

Sediment loads are typically high in flowlines in the Pilbara following large rainfall events and any increase to the sediment load caused by the proposed clearing is likely to be negligible (Rio Tinto, 2012). If clearing of riparian vegetation is required there may be some localized short term sedimentation during the clearing process, however, this is not likely to be an ongoing issue. Potential impacts to riparian vegetation may be minimised through the implementation of a vegetation management condition. The clearing of vegetation as a result of this proposal is therefore unlikely to result in any further deterioration in surface or groundwater quality in the local area.

The application area has a groundwater salinity that ranges from potable to marginal (500 - 1,000 milligrams/Litre Total Dissolved solids (TDS) (GIS Database). The proposed clearing of 90 hectares of native vegetation over an application area of 203 hectares is unlikely to further deteriorate the quality of underground water (GIS Database).

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

Methodology CALM (2002)

Rio Tinto (2012)
GIS Database:
- Geodata, Lakes
- Hydrography, Linear
- Public Drinking Water Source Areas
- RIWI Act, Groundwater Areas
- Groundwater Salinity, Statewide

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

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

The application area experiences a semi-desert tropical climate, with an annual average rainfall of approximately 315.3 millimetres per year (CALM, 2002; BoM, 2012). Based on an average annual evaporation rate of 3,200 - 3,600 millimetres (BoM, 2012), any surface water resulting from rainfall events is likely to be relatively short lived.

Given the size of the area to be cleared (90 hectares) compared to the size of the Ashburton catchment area (7,877,743 hectares) (GIS Database) it is not likely that the proposed clearing will lead to an appreciable increase in run off, and subsequently cause or exacerbate the incidence or intensity of flooding.

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

Methodology BoM (2012)
CALM (2002)
GIS Database:
- Hydrographic Catchments ? Catchments

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

Comments

There are two Native Title claims over the area under application. The claim WC10/16 was registered with the National Native Title Tribunal on 10 December 2010. The claim WC10/11 was registered with the National Native Title Tribunal on 17 September 2010. The mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are three registered Aboriginal Site of Significance within the application area (Site IDs: 7291, 19369 and 19372 (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

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

The clearing permit application was advertised on 30 July 2012 by the Department of Mines and Petroleum inviting submissions from the public. One submission was received in relation to this application regarding an extension of the comment period. A written response was provided on the matters raised.

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

4. References

- Biota (2009) Western Range Phase I: Vegetation and Flora Summary Report, Prepared for Rio Tinto Iron Ore, December 2009.
- BoM (2012) Climate Statistics for Australian Locations. A Search for Climate Statistics for Paraburdoo Aero, Australian Government Bureau of Meteorology, viewed 29 August 2012, <http://reg.bom.gov.au/climate/averages/tables/cw_007185.shtml>.
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions. Pilbara 3 (PIL4 - Hamersley subregion) Department of Conservation and Land Management, Western Australia.
- DEC (2012) NatureMap - Mapping Western Australia Biodiversity, Department of Environment and Conservation, viewed 17 August 2012, <<http://naturemap.dec.wa.gov.au>>.
- Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.
- Department of Sustainability, Environment, Water, Population and Communities (DSEWPac) (2012) *Liasis olivaceus barroni* - Olive Python (Pilbara subspecies), viewed 31 August 2012 <http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=66699>.

- Ecologia (2011) Rio Tinto Paraburdoo Mine Area Botanical Survey and Vertebrate Fauna Survey, Prepared for Rio Tinto Iron Ore, November 2011.
- Government of Western Australia (2011) 2011 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). 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.
- Mattiske (2011) Flora and Vegetation Survey of the Turee Syncline Area, Prepared for Rio Tinto Iron Ore, October 2011.
- Morgan, B (2012) Flora, Vegetation and Fauna Survey for the Turee Syncline Marra Mamba Evaluation Drilling. Report for Rio Tinto (Report in Preparation).
- Pilbara Flora (2011) Flora and Vegetation Surveys for the Paraburdoo Magazine and the Tom price Powerline Infrastructure Areas, Prepared for Rio Tinto Iron Ore, January 2011.
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- Rio Tinto (2012) Turee Creek Water Pipeline Upgrade and Paraburdoo Town feeder One Line Replacement, June 2012.
- Tutt, M., S. Fekete, S. Mitchell, P. Brace & D. Pearson (2004) Unravelling the mysteries of Pilbara Olive Python ecology. Threatened Species Network Community Grants Final Report- Project WA11/101. Karratha: Nickol Bay Naturalists' Club/WA CaLM.
- Van Vreeswyk, A.M.E., Payne, A.L., Hennig, P., and Leighton, K.A. (2004) An Inventory and Condition Survey of the Pilbara Region, Western Australia, Department of Agriculture, Western Australia.

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.

