Government of **Western Australia**
Department of **Mines and Petroleum**

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 4915/1
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 4SA (AML 70/4)
Local Government Area: Shire of Ashburton
Colloquial name: Western Turner Syncline Marra Mamba Project

1.4. Application

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

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 24 May 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. The following Beard vegetation associations are located within the application area (GIS Database):

82: Hummock grasslands, low tree steppe; snappygum over *Triodia wiseana*; and

567: Hummock grasslands, shrub steppe; mulga and kanji over soft spinifex & *Triodia basedowii*.

A flora and vegetation survey of the application area was undertaken by Rio Tinto Iron Ore (RTIO) on 4 July and 27 October 2011. The survey identified the following ten vegetation units (RTIO, 2012a):

1. Stony Slope 1 (SS1): *Acacia aneura* high shrubland over *Eremophila forrestii* open shrubland over *Triodia pungens*, *Triodia wiseana* very open hummock grassland over various very open herbs.

2. Stony Slope 2 (SS2): *Eucalyptus leucophloia* woodland over *Triodia wiseana* very open hummock grassland over *Trachymene oleracea*, *Goodenia stobbsiana* herbs.

3. Stony Slope 3 (SS3): *Eucalyptus leucophloia*, *Acacia pruinocarpa*, *Acacia aneura*, *Grevillea berryana* low open forest over *Acacia rhodophloia*, *Dodonaea pachyacra* open shrubland over *Triodia wiseana* hummock grassland.

4. Stony Slope 4 (SS4): *Eucalyptus leucophloia*, *Grevillea berryana* low open woodland over *Acacia pruinocarpa*, *Acacia aneura*, *Acacia kempeana* open scrub over *Acacia exilis*, *Senna glutinosa* open shrubland over *Triodia wiseana* hummock grassland.

5. Stony Slope 5 (SS5): *Eucalyptus leucophloia* low woodland over various *Acacia's*, *Senna's*, *Corchorus lasiocarpus* low open shrubland over *Triodia wiseana* hummock grassland over various *Ptilotus*, *Trachymene oleracea* very open herbs.

6. Stony Slope 6 (SS6): *Acacia* various *aneura*, *Grevillea berryana* low open forest over *Eremophila forrestii* shrubland over *Triodia wiseana* open hummock grassland.

7. Hill Top 1 (HT1): *Corchorus lasiocarpus*, various *Acacia* regrowth low open shrubland over *Bulbostylis barbata* sedges over various very open herbs.

8. Hill Top 2 (HT2): *Corymbia hamersleyana* scattered low trees over *Senna pruinosa*, *Senna glutinosa* shrubland over *Corchorus lasiocarpus* low open shrubland over *Triodia wiseana* very open hummock grassland over various open herbs.

9. Hill Top 3 (HT3): *Eucalyptus leucophloia* low woodland over *Triodia wiseana* open hummock grassland over various very open herbs.

10. Drainage Line (DL1): *Eucalyptus leucophloia* low open woodland over *Acacia citrinoviridis* high shrubland over *Petalostylis labicheoides*, *Stylobasium spathulatum* shrubland over *Triodia pungens* very open hummock

grassland.

Biota Environmental Sciences (Biota) (Biota, 2012) has surveyed a portion of the application area and also identified a vegetation type associated with gullies within the application area. This is described as:

Corymbia ferriticola low open woodland over *Acacia aneura*, *A. citrinoviridis* tall shrubland over *Triodia brizoides*, *T. epactia* open hummock grassland with *Eriachne mucronata* very open tussock grassland.

Clearing Description

Hamersley Iron Pty Ltd has applied to clear 84 hectares within an application area of approximately 691 hectares (GIS Database). The application area is located approximately 31 kilometres west, south west of Tom Price and 14 kilometres west, south west of the Rio Tinto Western Turner Syncline iron ore mine (GIS Database; RTIO, 2012a).

The purpose of the application is for exploration drilling for an infill drilling program within the Western Turner Syncline Marra Mamba tenement. Clearing will be by bulldozer. Vegetation and topsoil will be stockpiled for use in rehabilitation.

Vegetation Condition

Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994);

To

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

Comment

The overall condition of each vegetation unit was determined by RTIO using a scale based on Trudgen (1988). These condition ratings were converted to the Keighery (1994) scale by the assessing officer.

Ninety percent of the application area had recently been affected by fire and some existing access tracks occur within the application area (RTIO, 2012a).

RTIO (2012a) notes that the application area was assessed over a two day period only and was not seasonally assessed to capture short-lived and annual species. Ephemeral species with short or sporadic growth windows such as short-lived forbs and grasses may have also been missed as the ground was drying out after several months of no rainfall (RTIO, 2012a). The flora species list for the application area is therefore deemed representative rather than comprehensive (RTIO, 2012a).

The RTIO vegetation survey (2012a) was based on a review of existing information for the application area and a site visit by a RTIO botanist on 4 July and 27 October 2011. Approximately 50% of the application area has been covered by a Phase 2 vegetation and flora survey by Biota (Biota, 2012). Biota (2012) incorporates the results of six surveys undertaken in 2007 and 2011. In total these surveys cover approximately 22,308 hectares over the Western Turner Syncline area (West Turner area).

Fauna information was based on incidental fauna sightings and dominant landforms and vegetation types observed during the vegetation survey (RTIO, 2012a). A portion of the southern most part of the application area was included in a Two Phase fauna survey undertaken by Biota in 2007 and 2008 over approximately 11,575 hectares in the West Turner area (Biota, 2009). Biota has also conducted other fauna surveys within the West Turner area.

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 vegetation survey identified ten vegetation units within the application area (RTIO, 2012a). Six were associated with stony slopes, three were associated with hill tops and one was associated with a drainage line. RTIO (2012a) considered these to be well-represented in this section of the Hamersley sub region. Biota (2012) also identified a vegetation unit associated with gullies within the application area. These areas are considered to be conservation significant as the landforms and vegetation they support have value as refugia for fire sensitive species and other species which prefer rocky, mesic habitats (Biota, 2012). RTIO (2012b) has mapped the gully vegetation unit within several gorge/gullies within the application area and states that the proposed clearing will avoid these areas with the exception of an existing track in one of these areas where maintenance activities are required.

A total of 189 native vascular plant taxa from 91 genera belonging to 44 families were recorded from the application area (RTIO, 2012a). This number was considered to be within the expected range for an area of this size in the locality (RTIO, 2012a). RTIO (2012a) adds that the dominant families and genera, and assortment of species present, are typical of the local area and are also representative of the greater Pilbara region.

The vegetation survey recorded three introduced species within the application area including Ruby Dock (*Acetosa vesicaria*), Purslane (*Portulaca oleracea*) and Buffel Grass (*Cenchrus ciliaris*) (RTIO, 2012a). None of these species are a 'Declared Plant' under the *Agriculture and Related Resources Protection Act 1976*, however, Buffel Grass and Ruby Dock are considered to be serious environmental weeds (RTIO, 2012a). Potential impacts from weeds as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

No Threatened Flora or Threatened or Priority Ecological Communities have been recorded within the application area (GIS Database; RTIO, 2012a).

The vegetation survey recorded three Priority 3 Flora species within the application area; *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301), *Sida* sp. Barlee Range (S. van Leeuwen 1642) and *Ptilotus subspinescens* (RTIO, 2012a). Biota (2012) also reported the occurrence of these Priority Flora species, with *Ptilotus subspinescens* recorded within the application area (same location recorded by RTIO (2012a)).

Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301) was recorded at three locations within the application area consisting of one to ten individuals. Biota (2012) reported approximately 603 individuals of this species from 88 locations from scree slopes, gullies and creeklines within the West Turner study area. *Ptilotus subspinescens* was recorded at one location within the application area consisting of 30 to 50 individuals. Biota (2012) reported this species from 79 locations and that approximately 959 individuals were observed on the low stony undulating plains within the West Turner study area. *Sida* sp. Barlee Range (S. van Leeuwen 1642) was recorded at one location within the application area. Biota (2012) reported approximately 501 individuals of this species from 106 locations on low rocky slopes within the West Turner study area.

RTIO (2012a) state that an environmental restriction zone will be placed around the *Sida* sp. Barlee Range (S. van Leeuwan 4301), *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) and *Ptilotus subspinescens* flora populations and that these areas are to be avoided where it is feasible. Based on this and given populations and suitable habitat have been recorded outside the application area, the proposed clearing is not expected to have a significant impact on these species.

Biota (2012) also reported the occurrence of four additional Priority 3 and two Priority 4 Flora species within the West Turner study area, however, none were recorded during the vegetation survey of the application area. According to Biota (2012), none of the abovementioned Priority 3 Flora species or the Priority 4 Flora species found in close proximity to the application area are thought to be highly restricted.

Biota (2009) recorded one amphibian, 47 reptile, 58 bird and 20 mammal species within the West Turner study area and noted that the species recorded were generally representative of the taxa commonly recorded in this part of the bioregion. Three primary habitats were identified by RTIO within the application area, all of which are considered reasonably widespread in this section of the Hamersley sub region (RTIO, 2012a). Biota (2009) also identified gorge habitat within the application area and found that available habitat data indicated that no restricted or uncommon geological units or land systems occur within the West Turner area.

Given the application area is representative of the Hamersley subregion, it is unlikely the application area comprises higher biological diversity than surrounding undisturbed areas.

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

Methodology

Biota (2009)
Biota (2012)
RTIO (2012a)
RTIO (2012b)
GIS Database:
- Threatened and Priority Flora
- 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 may be at variance to this Principle

The vegetation survey identified three primary habitat types including hill tops and slopes dominated by Eucalypts over Acacia's over spinifex (*Triodia* spp.); Mulga shrubland over spinifex hummock grassland on rocky slopes; and drainage areas (RTIO, 2012a). These are considered to be reasonably widespread in the West Turner Area (RTIO, 2012a). Biota (2009) also identified gorge habitat within the application area. Further information provided by RTIO (2012b) maps gorge/gullies at seven locations within the application area. These are considered conservation significant as they provide refugia for fire sensitive species and other species which prefer rocky, mesic habitats (Biota, 2012). Potential impacts to gorge/gully habitat as a result of the proposed clearing may be minimised by the implementation of a condition that restricts clearing in these areas.

No conservation significant species were recorded during the vegetation survey, however, three mounds of the conservation significant species Western Pebble-mound Mouse (*Pseudomys chapmani*) (Priority 4) were observed within the application area (RTIO, 2012a). This species occurs on gentle slopes with suitable sized stones for constructing pebble mounds and is relatively widespread in the Pilbara.

Biota (2009) reported the occurrence of four conservation significant fauna species within the West Turner study area including Western Pebble-mound Mouse, Australian Bustard (*Ardeotis australis*) (Priority 4), *Notoscincus butleri* (Priority 4) and Rainbow Bee-eater (*Merops ornatus*) (Marine; Migratory under *EPBC Act*; Schedule 3), however, none of these were located within the application area. The Australian Bustard and Rainbow Bee-eater have widespread distributions and are mobile species that are able to utilise a variety of habitats. *Notoscincus butleri* occurs within the north west of the Pilbara bioregion and is associated with spinifex dominated areas near creek and river margins (Biota, 2009).

Local impacts to the above mentioned species may occur; however, given suitable habitat for these species is considered well represented in the Pilbara, the proposed clearing is not expected to have a significant impact on these species.

The Northern Quoll (*Dasyurus hallucatus*) (Endangered; Schedule 1) and Pilbara Olive Python (*Liasis olivaceus barroni*) (Vulnerable; Schedule 1) may also occur within the application area. The Northern Quoll is most abundant in open, rocky habitat and is also commonly found in gorges and near creek lines and may occur within the West Turner study area where breakaways and prominent creek lines occur (Biota, 2009). However, Biota (2012) notes that no Northern Quolls were recorded during three fauna surveys undertaken in the West Turner area, despite targeted sampling effort. A single specimen of the Pilbara Olive Python was recorded in a gorge during one of the West Turner fauna surveys (Biota, 2009). This species occurs in rocky areas within the Pilbara, showing a preference for habitats near water, particularly rock pools (Biota, 2009). Gorge/gully habitat may therefore represent significant habitat for these two species. Potential impacts to gorge/gully habitat as a result of the proposed clearing may be minimised by the implementation of a condition that restricts clearing in these areas.

Several other conservation significant species may also utilise the application area. However, based on factors such as species mobility, distribution and core or preferred habitat requirements and given the availability of similar habitat in surrounding areas and the avoidance of gorge/gullies, these species are unlikely to be significantly impacted by the proposed clearing.

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

Methodology
Biota (2009)
Biota (2012)
RTIO (2012a)
RTIO (2012b)

(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). No Threatened Flora was recorded during the vegetation survey undertaken on 4 July and 27 October 2011 (RTIO, 2012a).

The Threatened Flora species, *Lepidium catapycnon*, has been recorded from approximately 25 kilometres east of the application area in two stands comprising over 1,000 individuals in a 2007 survey of the West Turner area (Biota, 2012). This species occurs on skeletal soils and hillsides (Western Australian Herbarium, 2012). RTIO (2012a) states that despite suitable habitat occurring within the application area, no sightings were observed during the survey and it is unlikely to have been overlooked given the species perennial growth form and distinctive zig zag stem.

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

Methodology
Biota (2012)
RTIO (2012a)
Western Australian Herbarium (2012)
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 approximately 15 kilometres north east of the application area (GIS Database).

The vegetation survey did not record any TECs (RTIO, 2012a).

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

Methodology
RTIO (2012a)
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 Biogeographic Regionalisation of Australia (IBRA) bioregion in which approximately 99.6% of the pre-European vegetation remains (see table) (GIS Database, Government of Western Australia, 2011).

The vegetation of the application area has been mapped as the following Beard vegetation associations (GIS Database):

82: Hummock grasslands, low tree steppe; snappygum over *Triodia wiseana*; and
567: Hummock grasslands, shrub steppe; mulga and kanji over soft spinifex & *Triodia basedowii*.

Approximately 99.5% of Beard vegetation association 82 and approximately 99.7% of Beard vegetation association 567 remains at both a state and bioregional level (Government of Western Australia, 2011). Therefore the area proposed to be cleared does not represent a significant remnant of native vegetation within an area that has been extensively cleared.

	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	~99.6	Least Concern	6.3
Beard veg assoc. – State					
82	2,565,901	2,553,217	~99.5	Least Concern	10.2
567	777,507	774,896	~99.7	Least Concern	22.3
Beard veg assoc. – Bioregion					
82	2,563,583	2,550,899	~99.5	Least Concern	10.2
567	776,824	774,213	~99.7	Least Concern	22.4

* Government of Western Australia (2011)
** 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 (2011)
GIS Database:
- IBRA WA (Regions – Sub Regions)
- Pre-European Vegetation

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

Comments

Proposal is at variance to this Principle

There are numerous minor, non-perennial watercourses within the application area (GIS Database). It is expected that these would only flow after or during significant seasonal rainfall events, or substantial localised falls. Available databases show there are numerous minor, non-perennial watercourses within the vicinity of the application area (GIS Database).

One vegetation unit was identified as growing in association with a watercourse within the application area (RTIO, 2012a). This vegetation unit was found growing along drainage lines within the application area. RTIO (2012a) states that all vegetation units are well represented in this section of the Hamersley sub region and that the dominant families and genera, and assortment of species present, are typical of the local area and are also representative of the greater Pilbara region.

Given there are numerous minor non-perennial watercourses within and surrounding the application area and vegetation growing along the watercourses is well represented in the Hamersley sub region, it is unlikely the proposed clearing will have a significant impact on watercourses within the area.

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

Methodology

RTIO (2012a)
GIS Database:
- Hydrography, linear

- Rivers

(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 has been mapped as occurring on the Newman, Rocklea and Table land systems (GIS Database). The Newman land system consists of rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands. The Rocklea land system consists of basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex (and occasionally soft spinifex) grasslands. The Table land system consists of low calcrete plateaux, mesas and lower plains supporting mulga and cassia shrublands and minor spinifex grasslands. These land systems are generally not prone to erosion (Van Vreeswyk et al., 2004).

The average annual evaporation rate is over 10 times the average annual rainfall, so it is unlikely the proposed clearing will result in increased groundwater recharge causing raised saline water tables (GIS Database; BoM, 2012).

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

Methodology

BoM (2012)
Van Vreeswyk et al. (2004)
GIS Database:
- Evaporation Isopleths
- 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 or Department of Environment and Conservation (DEC) managed lands (GIS Database). The nearest conservation reserve is Karijini National Park, located approximately 40 kilometres east of the application area (GIS Database). Based on the distance between the application area and Karijini National Park, the proposed clearing is not likely to impact the environmental values of any 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

According to available databases, the application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database). There are no permanent waterbodies or watercourses within the application area, however, there are numerous minor, non-perennial watercourses that occur within the application area (GIS Database). It is expected that these would only flow after or during significant seasonal rainfall events, or substantial localised falls (RTIO, 2012a).

The annual average rainfall for Paraburdoo is 317.3 millimetres and the average annual evaporation rate for the application area is approximately 3,400 millimetres (BoM, 2012; GIS Database). Based on these averages, surface water is likely to evaporate quickly with surface sheet flow and higher sediment levels predominantly occurring during larger rainfall events. Therefore, during normal rainfall events, the proposed clearing would not likely lead to an increase in sedimentation of watercourses within the application area.

According to available databases, groundwater salinity within the application area is between 500 and 1,000 milligrams/Litre Total Dissolved Solids (TDS) (GIS Database). This is considered fresh to marginal. The proposed clearing is not likely to cause salinity levels within the application area to alter significantly.

RTIO (2012a) states that given the small scale of clearing required for the proposed activities, there is no reason to expect surface or groundwater quality in the area would be affected.

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

Methodology

BoM (2012)
RTIO (2012a)
GIS Database:
- Evaporation Isopleths
- Groundwater Salinity, Statewide
- Hydrography, linear

- 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 the Ashburton River catchment area (GIS Database). Given the size of the area to be cleared (84 hectares) in relation to the size of the catchment area (7,877,743 hectares) (GIS Database), the proposed clearing is not likely to increase the potential of flooding on a local or catchment scale.

With an average annual rainfall of 317.3 millimetres and an average evaporation rate of approximately 3,400 millimetres there is likely to be little surface flow during normal seasonal rains (BoM, 2012; GIS Database). Whilst large rainfall events may result in flooding of the area, the proposed clearing is not likely to lead to an increase in 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)
GIS Database:
- Evaporation Isopleths
- 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: WC97/89 and WC10/16 (GIS Database). Native title claim WC97/89 has been determined by the Federal Court and WC10/16 has been registered with the Native Title Tribunal on behalf of the claimant groups. 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 are no registered Aboriginal Sites of Significance within the application area (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

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

The clearing permit application was advertised on 12 March 2012 by the Department of Mines and Petroleum inviting submissions from the public. One submission was received from a direct interest party advising they have no objection to the proposed clearing.

Methodology

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

4. References

Biota (2009) A Two-Phase Fauna Survey of the West Turner Syncline Area. Unpublished report prepared for Pilbara Iron Company dated May 2009.

Biota (2012) West Turner Syncline Phase 2 Vegetation and Flora Report. Unpublished report prepared for Rio Tinto dated January 2012.

BoM (2012) Climate Statistics for Australian Locations. A Search for Climate Statistics for Paraburdoo Aero, Australian Government Bureau of Meteorology, viewed 18 April 2012, < http://www.bom.gov.au/climate/averages/tables/cw_007185.shtml>.

Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.

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.

RTIO (2012a) Flora and Vegetation Survey for Proposed Evaluation Drilling at Western Turner Syncline Marra Mamba Native Vegetation Clearing Permit Supporting Report. Unpublished report dated February 2012.

RTIO (2012b) Further Information provided by RTIO in email correspondence dated 3 May to 8 May 2012.

Trudgen, M.E. (1988) A Report on the Flora and Vegetation of the Port Kennedy Area. Unpublished Report Prepared for

Bowman Bishaw and Associates, West Perth.
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. Department of Agriculture, Western Australia.
Western Australian Herbarium (2012) Florabase - The Western Australian Flora. Department of Environment and Conservation. Available online at http://florabase.dec.wa.gov.au/ Accessed in April 2012.

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.