



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 6230/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **BC Iron Nullagine Pty Ltd**

1.3. Property details

Property: Miscellaneous Licences: 46/80, 46/82, 46/83, 46/84, 46/85, 46/93, 46/94, and 46/95
General Purpose Lease 46/9

Local Government Area: Shire of East Pilbara

Colloquial name: Nullagine Iron Ore Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
190		Mechanical Removal	Mineral Production and associated activities

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 19 February 2015

2. Background

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description

The clearing permit application area has been broadly mapped as the following Beard vegetation associations:

29: sparse low woodland; Mulga, discontinuous in scattered groups;

173: hummock grasslands, shrub steppe; Kanji over soft Spinifex and *Triodia wiseana* on basalt; and

562: mosaic: low woodland; Mulga in valleys / hummock grasslands; open low tree steppe; Snappy Gum over *Triodia wiseana* (GIS Database).

Beard vegetation association 173 represents the majority of the application area.

Extensive flora and vegetation surveys have been conducted over the Nullagine Iron Ore project area by Astron Environmental Services (Astron) during 2008 and by Plantecology Consulting (Plantecology) during 2013.

Astron (2009) identified the following 25 vegetation communities within the application area:

D1a - *Corymbia hamersleyana* scattered trees over mixed *Acacia* spp. scattered shrubs to shrubland over *Triodia epactia* hummock grassland.

D2a - *Corymbia hamersleyana* scattered low trees to low woodland over mixed *Acacia* spp. Scattered shrubs to shrubland over mixed *Triodia epactia* hummock / **Cenchrus* spp. Tussock grassland.

D2b - *Corymbia hamersleyana* scattered low trees over mixed *Acacia* spp. shrubland over mixed *Triodia epactia* hummock / *Paraneurachne muelleri* tussock grassland.

D3a - *Corymbia hamersleyana* scattered trees over scattered mixed shrubs over mixed *Cymbopogon ambiguus* tussock grassland / *Cyperus vaginatus* sedgeland.

D6b - *Eucalyptus victrix* woodland over *Melaleuca* spp. high shrubland over mixed *Triodia longiceps* hummock / **Cenchrus* spp. tussock grassland / *Cyperus vaginatus* sedgeland.

D8a - Mixed *Acacia* spp. shrubland over *Triodia epactia* hummock grassland.

D8b - Mixed *Acacia* spp. shrubland over *Triodia longiceps* hummock grassland.

D8b/H9a - Mosaic of vegetation communities D8b and H9a.

D8b/H9b - Mosaic of vegetation communities D8b and H9b.

D12a - **Vachellia farnesiana* shrubland over **Cenchrus ciliaris* tussock grassland.

H1a - *Corymbia hamersleyana* scattered low trees over mixed *Acacia* spp. scattered shrubs to shrubland over *Triodia epactia* hummock grassland.

H1b - *Corymbia hamersleyana* scattered low trees over mixed *Acacia* spp. shrubland over *Triodia wiseana* hummock grassland.

H1b/H1a - Mosaic of vegetation communities H1b and H1a.

H2a - *Corymbia hamersleyana* scattered low trees over mixed *Acacia* spp. scattered shrubs to shrubland over mixed *T. epactia* hummock / tussock grassland.

H3a - *Eucalyptus leucophloia* scattered low trees over mixed *Acacia* spp. scattered shrubs to shrubland over *Triodia epactia* hummock grassland.

H3c - *Eucalyptus leucophloia* scattered low trees to low woodland over mixed *Acacia* spp. scattered shrubs to shrubland over *Triodia wiseana* hummock grassland.

H6a - *Acacia pruinocarpa* scattered low trees over mixed *Acacia* spp. scattered shrubs over *Triodia epactia* hummock grassland.

H6a/H12a - Mosaic of vegetation communities H6a and H12a.

H7a - *Acacia pruinocarpa* low woodland over mixed scattered shrubs to shrubland over mixed *Triodia epactia* hummock / mixed tussock grassland.

H7a/H3b - Mosaic of vegetation communities H7a and H3b.

H9a - Mixed *Acacia* spp. scattered shrubs to shrubland over *Triodia epactia* hummock grassland.

H9b - Mixed *Acacia* spp. scattered shrubs to shrubland over *Triodia wiseana* hummock grassland.

H10b - Mixed *Senna* spp. scattered shrubs to shrubland over *Triodia brizoides* / *T. epactia* hummock grassland.

H12a - Mixed *Triodia epactia* hummock / *Eriachne* spp. tussock grassland.

PC1b - Mixed low shrubs over *Ptilotus gomphrenoides* herbland and mixed *Panicum laevinode* open tussock grassland.

The vegetation communities identified by Plantecology Consulting were consistent with those identified by Astron (BC Iron, 2014).

* Denotes a weed species

Clearing Description

Nullagine Iron Ore Project.
BC Iron Nullagine Pty Ltd (BC Iron) proposes to clear up to 190 hectares of native vegetation within a boundary of approximately 4793 hectares, for the purpose of mineral production and mining-related infrastructure. The project is located approximately 19 kilometres southwest of Nullagine, within the Shire of East Pilbara.

Vegetation Condition

Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery, 1994);
To
Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery, 1994).

Comment

The vegetation condition was derived from a vegetation survey conducted by Plantecology Consulting (Plantecology, 2013).
Much of the application area overlaps with the application areas of three previously granted clearing permits, associated with earlier stages of the development of the Nullagine Iron Ore Project. This application includes clearing for additional mining related infrastructure for the continued development of the project.
The application area consists of a haul road corridor approximately 50 kilometres long, connecting to a minesite and mining related infrastructure.

3. Assessment of application against Clearing Principles

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

Comments

Proposal may be at variance to this Principle

The application area is located within the Chichester and Fortescue subregions of the Pilbara Bioregion of the Interim Biogeographic Regionalisation for Australia (IBRA) (GIS Database). The majority of the application area is mapped as the Chichester subregion, with a small part of the southern end of the application area mapped as falling within the northern boundary of the Fortescue subregion (GIS Database). The Chichester subregion is characterised by undulating granite and basalt plains typically supporting a shrub steppe and hummock grasslands of *Acacia inaequilatera* over *Triodia wiseana*; and significant areas of basaltic ranges typically supporting tree steppes of *Eucalyptus leucophloia*. The hummock grasslands which host reptile and small mammal communities, and the cracking clay communities of the Chichester Range and Mungaroon Range are identified as areas of high species and ecosystem biodiversity within the subregion (CALM, 2002).

The vegetation condition within the application area ranges from Very Good to Degraded, with parts of the application area having been previously disturbed by grazing and mining related activities (BC Iron, 2014; Plantecology, 2013). The application area falls wholly within pastoral leases, mainly the Bonney Downs and Hillside pastoral leases, with a very small section at the southern end of the application area falling within the Roy Hill pastoral lease (GIS Database). Previous vegetation disturbance has occurred from pastoral activities, including substantial weed invasion particularly by the introduced pastoral grass species *Cenchrus ciliaris* (Buffel Grass) (BC Iron, 2014). A total of 14 weed species were recorded within the application area (BC Iron, 2014; Plantecology, 2013). Weeds have the potential to out-compete native flora and reduce 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.

The southern end of the application area occurs within the buffer zone of a Priority Ecological Community (PEC), the 'Fortescue Marsh land system', a Priority 1 PEC associated with the Fortescue Marsh. The Fortescue Marsh is located at the upper terminus of the Fortescue River and the western end of the Goodiadarrie Hills, and is an ecologically important ephemeral wetland supporting a diverse ecosystem (DPaW, 2014). However, the southern end of the clearing permit application area (the southern end of the haul road) is located approximately eight kilometres north of the edge of the Fortescue Marsh, and the proposed clearing for the haulroad within the PEC buffer zone is unlikely to have any impact on the environmental values of the Fortescue Marsh. Astron (2009) suggested that some of the vegetation communities recorded within the application area had similarities to the PEC known as the 'Plant Assemblages of the Wona Land System' (Priority 1), a system of basalt upland gilgai plains with tussock grasslands occurring within the Wona Land System (DPaW, 2014). However Plantecology (2013) concluded that, although there were some similarities, none of the vegetation associations within the application area were representative of the Wona PEC.

Several flora and vegetation surveys have been conducted over the application area and surrounding areas by Astron (2009) and Plantecology (2013). Astron (2009) identified a total of 462 native vascular flora species representing 172 genera from 58 families, which was considered to represent a high level of floristic diversity. The dominant families were represented by the Grass family (Poaceae), Hibiscus family (Malvaceae), Pea family (Papilionaceae) and the Acacia family (Mimosaceae) (Astron, 2009).

No Declared Rare Flora or Threatened Ecological Communities have been recorded within the application area (BC Iron, 2014; GIS Database). Desktop searches identified several Priority Flora species with the potential to occur within the application area, based on habitat preferences and known distributions (BC Iron, 2014).

Astron (2009) recorded six species of Priority Flora during the flora survey of the project area and surrounding areas, one of which *Ptilotus mollis* (Priority 4) was recorded within the clearing application area. This species is well represented outside of the application area, and the proposed clearing is unlikely to impact the conservation status of this species (Astron, 2009; Western Australian Herbarium, 2014).

Fauna surveys of the application area and surrounding areas conducted by M.J. & A.R. Bamford Consulting Ecologists (Bamford) recorded a total of 168 fauna, including four fish, four frog, 39 reptile, 96 bird and 25 mammal species (Bamford, 2009). In general, the faunal assemblage was considered to be typical of the region (Bamford, 2013). However, seven fauna species of conservation significance have been recorded within the survey area and a total of 41 fauna species of conservation significance may occur in the area (Bamford, 2009, 2013).

The landforms, vegetation associations and fauna habitat types found in the application area are well represented within the region (BC Iron, 2014; GIS Database).

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

Methodology

Astron (2009)
Bamford (2009)
Bamford (2013)
BC Iron (2014)
CALM (2002)
DPaW (2014)
Plantecology (2013)

Western Australian Herbarium (2014)
GIS Database:
- IBRA WA (Regions - Sub Regions)
- Pastoral Leases
- Pre-European Vegetation
- 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

Fauna surveys conducted by Bamford (2009, 2013) identified the following five broad fauna habitat types within the application area:

1. Acacia shrubs over hummock grasslands on stony hills and plains;
2. Eucalypt woodland over hummock grasslands on stony hills and plains;
3. Bloodwood woodland over hummock grasslands on undulating stony hills;
4. Well-developed cliff lines along mesa edges or gorges; and
5. Riparian zones.

Bamford (2009) reported that all of these habitat types are well represented outside of the application area.

The following fauna species of conservation significance were recorded during fauna surveys conducted over the application area and surrounding areas (Bamford, 2009, 2013):

- Pilbara Olive Python (*Liasis olivaceus barroni*) - Vulnerable;
- Australian Bustard (*Ardeotis australis*) - Priority 4;
- Rainbow Bee-eater (*Merops ornatus*) - Migratory;
- Star Finch (*Neochima ruficauda subclarescens*) - Priority 4;
- Striated Grasswren (*Amytornis striatus striatus*) - Priority 4;
- Northern Quoll (*Dasyurus hallucatus*) - Endangered; and
- Western Pebble-mound Mouse (*Pseudomys chapmani*) - Priority 4.

Of the five fauna habitat types recorded within the application area (listed above), the cliff line habitat and riparian zones were considered to be of highest conservation significance (BC Iron, 2014).

The cliff line habitat provides the potential for significant refugia for some fauna, including some conservation significant species such as the Northern Quoll and the Pilbara Olive Python (BC Iron, 2014). There is also the potential for caves to occur within this habitat type which may be used by bat species. Although the cliff line habitat extends outside of the application area, disturbance causing fragmentation of this habitat may have significant impacts on its fauna habitat values.

The riparian zone habitat surrounding ephemeral watercourses typically has a higher abundance and richness of fauna species than surrounding habitat types (BC Iron, 2014). Although the riparian habitat is well represented in the region, it comprises a relatively small proportion of the overall landscape, and in a regional context fauna are likely to be dependent on riparian zones in the landscape.

The proponent has a flora, vegetation and habitat management plan and a terrestrial fauna management plan in place to manage impacts to fauna species and minimise impacts to significant fauna habitat (BC Iron, 2014).

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

Methodology BC Iron (2014)
Bamford (2009)
Bamford (2013)
GIS Database:
- Pre-European Vegetation

(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 Declared Rare Flora (DRF) within the application area (GIS Database).

Flora surveys conducted over the application area and surrounding areas did not record any species of Threatened flora (BC Iron, 2014). The vegetation associations recorded within the application areas are well represented in surrounding areas (GIS Database; BC Iron, 2014), and the vegetation proposed to be cleared is unlikely to be necessary for the continued existence of any species of rare flora.

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

Methodology BC Iron (2014)
GIS Database:
- Declared Rare and Priority Flora List
- Pre-European Vegetation

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

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

There are no known Threatened Ecological Communities (TEC's) located within or in close proximity to the application area (GIS Database).

Surveys of the application area did not identify any Threatened Ecological Communities (BC Iron, 2014).

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

Methodology BC Iron (2014)
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 area applied to be cleared is located within the Pilbara IBRA bioregion (GIS Database). There is approximately 99% of pre-European vegetation remaining within the bioregion (Government of Western Australia, 2013).

The majority of the vegetation of the application area is broadly mapped as Beard vegetation association 173: hummock grasslands, shrub steppe; kanji over soft spinifex and *Triodia wiseana* on basalt. The southern end of the application area (representing approximately a quarter of the total application area) is broadly mapped as Beard vegetation association 562: mosaic: low woodland; Mulga in valleys / hummock grasslands; open low tree steppe; Snappy Gum over *Triodia wiseana* (GIS Database), while a very tiny area at the southernmost tip of the application area is mapped as Beard vegetation association 29: sparse low woodland; Mulga, discontinuous in scattered groups (GIS Database). Approximately 99% of the pre-European extent of these vegetation associations remains uncleared at both the state and bioregion level (Government of Western Australia, 2013). Hence, the vegetation proposed to be cleared does not represent a significant remnant of vegetation in an area that has been extensively cleared.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in DPaW Managed Lands
IBRA Bioregion - Pilbara	17,808,657	17,733,584	~ 99	Least Concern	~8.3
Beard vegetation association - State					
29	7,903,991	7,900,200	~ 99	Least Concern	~5.2
173	1,753,104	1,748,260	~ 99	Least Concern	~13.6
562	103,607	103,607	~100	Least Concern	0.0
Beard vegetation association - Bioregion					
29	1,133,219	1,132,939	~99	Least Concern	~1.9
173	1,752,520	1,747,678	~ 99	Least Concern	~13.6
562	103,607	103,607	~100	Least Concern	0.0

* 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)

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 no permanent watercourses or wetlands within or in close proximity to the application area (GIS database).

Numerous minor seasonal watercourses and one major seasonal watercourse pass through the application area (GIS Database). Seasonal watercourses in the region are dry for most of the year, only flowing briefly following significant rainfall events (BC Iron, 2014). Removal of vegetation may result in an increase in runoff and may increase sediment loads in surface water flows, however the impacts on any watercourses are likely to be minimal.

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

Methodology BC Iron (2014)
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 broadly mapped as occurring within the Bonney, Rocklea, Robe, McKay, Newman and Wona land systems, within the majority of the application area mapped as the Bonney or Rocklea land systems (GIS Database). Van Vreeswyk et al. (2004) report that these land systems are not generally susceptible to erosion.

Potential land degradation will be minimised through management measures including revegetation of temporarily disturbed areas and the construction of drains and bunds where necessary (BC Iron, 2014).

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

Methodology BC Iron (2014)
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 nearest conservation areas are the DPaW managed former Meentheena pastoral lease, which is located approximately 66 kilometres northeast of the northern end of the application area, and the Karijini National Park, which is located approximately 89 kilometres west of the southern end of the application area (GIS Database). The proposed clearing is unlikely to have any impacts on the environmental values of these or any other conservation area.

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

Methodology GIS Database:
- DEC proposed 2015 pastoral lease exclusions
- 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 within a Public Drinking Water Source Area, and there are no permanent watercourses or wetlands within the application area (GIS Database). Numerous seasonal watercourses pass through the application area (GIS Database). Drainage lines in the area are dry for most of the year, only flowing briefly immediately following significant rainfall (BC Iron, 2014). The undulating topography and low permeability of the predominantly stony clay-loam soils of the application area combine to produce significant runoff during high rainfall events (BC Iron, 2014), and runoff potential may be further increased by the proposed clearing. Management practices will be implemented to minimise the risk of erosion and potential impacts to surface water quality (BC Iron, 2014).

The proposed clearing is unlikely to result in a significant increase in sedimentation of the ephemeral watercourses, and is unlikely to cause deterioration in the quality of surface or underground water.

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

Methodology BC Iron (2014)
GIS Database:
- Geodata, Lakes
- Hydrography, Linear
- Public Drinking Water Source Areas

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

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

The climate of the region is semi-arid, with an average rainfall of approximately 300-350 millimetres per year (CALM, 2002). Drainage lines in the area are dry for most of the year, only flowing briefly immediately following significant rainfall (BC Iron, 2014).

There are no permanent water courses or waterbodies within the application area (GIS Database). Numerous seasonal water courses pass through the application area. Temporary localised flooding may occur during heavy rainfall events (BC Iron, 2014). However, the proposed clearing is unlikely to increase the incidence or intensity of natural flooding events.

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

Methodology BC Iron (2014)
CALM (2002)
GIS Database:
- Hydrography, linear

Planning instrument, Native Title, RIWI Act Licence, EP Act Licence, Works Approval, Previous EPA decision or other matter.

Comments

The clearing permit application was advertised on 15 September 2014 by the Department of Mines and Petroleum inviting submissions from the public. No submissions were received in relation to this application.

There are three native title claims (WC1999/016, WC2005/006 and WC2012/001) over the area under application (GIS Database). These claims have been registered with the National Native Title Tribunal on behalf of the claimant group. However, the mining tenement has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are numerous registered Aboriginal Sites of Significance located within or in close proximity to 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 noted that the proposed clearing may impact on a protected matter under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act). The proponent referred the initial stages of the Nullagine Project to the (Federal) Department of the Environment, Water, Heritage and the Arts (DEWHA) (now the Department of the Environment (DotE)) for assessment under the EPBC Act, and the project was determined to be a controlled action. In 2010 the DEWHA approved the project subject to conditions which included measures to manage and mitigate impacts to the Northern Quoll and limiting the area of disturbance for the project to 550 hectares. It is noted that a total of 538.9 hectares of clearing has been approved under three existing clearing permits (CPS 3723/2, CPS 3827/2 and CPS 3857/2) and that the proposed clearing of an additional 190 hectares will exceed the amount of disturbance currently approved for the project under the EPBC Act. The proponent is aware of their obligations under the EPBC Act, and intends to refer the current stage of the project to the DotE for further assessment under the EPBC Act.

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

Methodology

GIS Database:

- Aboriginal Sites of Significance
- Native Title Claims - Determined by the Federal Court
- Native Title Claims - Filed at the Federal Court
- Native Title Claims - Registered with the NNTT

4. References

- Astron (2009) Nullagine Project: Flora and Vegetation Survey: May - September 2008. Report prepared for BC Iron Limited, by Astron Environmental Services, Western Australia.
- Bamford (2009) Fauna Assessment of the BC Iron Nullagine Iron Ore Project. M.J. & A.R. Bamford Consulting Ecologists, Western Australia.
- Bamford (2013) BC Iron Nullagine Project Extension Areas - Bonnie East, Warrigal North and Coongan. Assessment of Fauna Values. M.J. & A.R. Bamford Consulting Ecologists, Western Australia. May 2013.
- BC Iron (2014) Native Vegetation Clearing Permit Application. BC iron Nullagine. August 2014.
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002. Department of Conservation and Land Management, Western Australia.
- 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.
- DPaW (2014) Priority Ecological Communities for Western Australia Version 21. Species and Communities Branch, Department of Parks and Wildlife. 25 November 2014. <http://www.dpaw.wa.gov.au/>
- 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.
- Plantecology (2013) Nullagine Iron Ore Joint Venture Project Extension. Level 2 Flora and vegetation Survey. Plantecology Consulting, May 2013.
- 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.
- Western Australian Herbarium (2014) FloraBase - the Western Australian Flora. Department of Parks and Wildlife. <https://florabase.dpaw.wa.gov.au/>

5. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government
DAA	Department of Aboriginal Affairs, Western Australia
DAFWA	Department of Agriculture and Food, Western Australia
DEC	Department of Environment and Conservation, Western Australia (now DPaW and DER)
DER	Department of Environment Regulation, Western Australia
DMP	Department of Mines and Petroleum, Western Australia
DRF	Declared Rare Flora
DotE	Department of the Environment, Australian Government
DoW	Department of Water, Western Australia
DPaW	Department of Parks and Wildlife, Western Australia
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DotE)
EPA	Environmental Protection Authority, Western Australia
EP Act	<i>Environmental Protection Act 1986</i> , Western Australia
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (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
PEC	Priority Ecological Community, Western Australia
RIWI Act	<i>Rights in Water and Irrigation Act 1914</i> , Western Australia
s.17	Section 17 of <i>the Environment Protection Act 1986</i> , Western Australia
TEC	Threatened Ecological Community

Definitions:

{DPaW (2013) Conservation Codes for Western Australian Flora and Fauna. Department of Parks and Wildlife, Western Australia}:-

- T** **Threatened species:**
 Specially protected under the *Wildlife Conservation Act 1950*, listed under Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna or the Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora).
 Threatened Fauna and Flora are further recognised by the Department according to their level of threat using IUCN Red List criteria. For example Carnaby's Cockatoo *Calyptorhynchus latirostris* is specially protected under the *Wildlife Conservation Act 1950* as a threatened species with a ranking of Endangered.
Rankings:
 CR: Critically Endangered - considered to be facing an extremely high risk of extinction in the wild.
 EN: Endangered - considered to be facing a very high risk of extinction in the wild.
 VU: Vulnerable - considered to be facing a high risk of extinction in the wild.
- X** **Presumed Extinct species:**
 Specially protected under the *Wildlife Conservation Act 1950*, listed under Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora (which may also be referred to as Declared Rare Flora).
- IA** **Migratory birds protected under an international agreement:**
 Specially protected under the *Wildlife Conservation Act 1950*, listed under Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice.
 Birds that are subject to an agreement between governments of Australia and Japan, China and The Republic of Korea relating to the protection of migratory birds and birds in danger of extinction.
- S** **Other specially protected fauna:**
 Specially protected under the *Wildlife Conservation Act 1950*, listed under Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice.
- P1** **Priority One - Poorly-known species:**
 Species that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, rail reserves and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.
- P2** **Priority Two - Poorly-known species:**
 Species that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, unallocated Crown land, water reserves, etc. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.
- P3** **Priority Three - Poorly-known species:**
 Species that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are

comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.

P4

Priority Four - Rare, Near Threatened and other species in need of monitoring:

- (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.
- (b) Near Threatened. Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.
- (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

P5

Priority Five - Conservation Dependent species:

Species that are not threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

Principles for clearing native vegetation:

- (a) Native vegetation should not be cleared if it comprises a high level of biological diversity.
- (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.
- (c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare 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.
- (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.
- (f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.
- (g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.
- (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.
- (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.
- (j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.