



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 8131/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Hamersley Iron Pty Ltd

1.3. Property details

Property: Special Lease for Mining Operations 3116/3467 (Document I 144501 L) Lot 7 on Deposited Plan 28944, pursuant to *Iron Ore (Hamersley Range) Agreement Act 1963*
Local Government Area: Shire of Ashburton
Colloquial name: Hardy River Borefield Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
90		Mechanical Removal	Construction and Operation of a Borefield, Pipelines and Associated Activities

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 22 November 2018

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description The vegetation of the application area is broadly mapped as the following Beard vegetation associations:
82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana*; and
567: Hummock grasslands, shrub steppe; mulga & kanji over soft spinifex & *Triodia basedowii* (GIS Database).

Several flora and vegetation surveys have been undertaken over various parts of the application. Hamersley Iron Pty Ltd (Hamersley) has summarised these surveys and identified 28 vegetation communities occurring within the study area (Hamersley, 2018):

Vegetation of stony hills and slopes

- H1:** AanAxTe: *Acacia aneura*, *A. xiphophylla* tall shrubland over *Triodia epactia* open hummock grassland.
- H2:** ElAmTbr: *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Acacia maitlandii* tall shrubland over *Triodia brizoides* hummock grassland.
- H3:** ElAmTw: *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Acacia maitlandii* tall shrubland over *Triodia wiseana* open hummock grassland.
- H4:** ElAprTw: *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Acacia pruinocarpa* tall open shrubland over *Triodia wiseana* hummock grassland.
- H5:** ElAsppTe: *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over mixed *Acacia* spp. open shrubland over *Triodia epactia* hummock grassland.
- H6:** ElChAiTw: *Eucalyptus leucophloia* subsp. *leucophloia*, *Corymbia hamersleyana* scattered low trees over *Acacia inaequilatera* scattered tall shrubs over *Triodia wiseana* hummock grassland.
- H7:** ElTbr: *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Triodia brizoides* hummock grassland.

Vegetation of stony plains and low spurs

- P1:** AanApr: *Acacia aneura*, (*A. pruinocarpa*) tall shrubland over mixed scattered hummock grasses.
- P2:** AanAprArTeTw: *Acacia aneura*, *A. pruinocarpa*, *A. rhodophloia* tall shrubland over *Triodia epactia*, *T. wiseana* hummock grassland.
- P3:** AanTmTw: *Acacia aneura* tall shrubland over *Triodia melvillei*, (*T. wiseana*) open hummock grassland.
- P4:** AxAanTaTlo: *Acacia xiphophylla*, *A. aneura* tall shrubland over *Triodia angusta*, *T. longiceps* very open hummock grassland.
- P5:** AxAanTw: *Acacia xiphophylla*, (*A. aneura*) tall shrubland over *Triodia wiseana* very open hummock grassland.
- P6:** CdAanAprGbTe: *Corymbia deserticola* subsp. *deserticola* scattered low trees over *Acacia aneura*, *A. pruinocarpa*, *Grevillea berryana* tall shrubland over *Triodia epactia* hummock grassland over *Aristida contorta* very open tussock grassland.
- P7:** ElAanTe: *Eucalyptus leucophloia* subsp. *leucophloia* low open woodland over *Acacia aneura* tall shrubland over *Triodia epactia* hummock grassland.

P8: EIAbTaTlo: *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Acacia bivenosa* open shrubland over *Triodia angusta*, *T. longiceps* open hummock grassland.
P9: EICdAsppTw: *Eucalyptus leucophloia* subsp. *leucophloia*, *Corymbia deserticola* subsp. *deserticola* scattered low trees over mixed *Acacia* scattered tall shrubs over *Triodia wiseana* open hummock grassland.
P10: EITloTe: *Eucalyptus leucophloia* subsp. *leucophloia* low open woodland over *Triodia longiceps*, *T. epactia* hummock grassland.
P11: EITwTa: *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Triodia wiseana*, (*T. angusta*) open hummock grassland.
P12: EsMeAbTaTw: *Eucalyptus socialis* subsp. *eucentrica* low open mallee woodland over *Melaleuca eleuterostachya*, *Acacia bivenosa* scattered shrubs over *Triodia angusta*, *T. wiseana* open hummock grassland.

Vegetation of creeklines, flowlines, floodplains and gullies

C1: AanAciTsp: *Acacia aneura*, *A. citrinoviridis* tall open scrub over mixed *Triodia* open hummock grassland.
C2: AcIAbTaCEC: *Acacia citrinoviridis*, *A. bivenosa* tall open scrub over *Triodia angusta* very open hummock grassland with *Cenchrus ciliaris* open tussock grassland.
C3: EcEvAci: *Eucalyptus camaldulensis* subsp. *refulgens*, *E. victrix* woodland over *Acacia citrinoviridis* tall open scrub.
C4: EIAbAmTe: *Eucalyptus leucophloia* subsp. *leucophloia* low open woodland over *Acacia bivenosa*, *A. maitlandii* tall open shrubland over *Triodia epactia* open hummock grassland.
C5: EIChAcIapyAmoTe: *Eucalyptus leucophloia* subsp. *leucophloia*, *Corymbia hamersleyana* low open woodland over *Acacia citrinoviridis*, *A. pyrifolia*, *A. monticola* tall open scrub over *Triodia epactia* open hummock grassland.
C6: EvAcITeCEC: *Eucalyptus victrix* scattered trees over *Acacia citrinoviridis* tall shrubland over *Triodia epactia* open hummock grassland and/or *Cenchrus ciliaris* open tussock grassland.
C7: ExAcITeCEC: *Eucalyptus xerothermica* low open woodland over *Acacia citrinoviridis* tall shrubland over *Triodia epactia* open hummock grassland with *Cenchrus ciliaris* open tussock grassland.
C8: ExEIAbAaTa: *Eucalyptus xerothermica*, *E. leucophloia* subsp. *leucophloia* scattered low trees over *Acacia bivenosa*, (*A. ancistrocarpa*) tall open scrub over *Triodia angusta* very open hummock grassland.
C9: ExEIPIAbAcITwTa: *Eucalyptus xerothermica*, *E. leucophloia* subsp. *leucophloia* low open woodland over *Petalostylis labicheoides*, *Acacia bivenosa*, *A. citrinoviridis* tall shrubland over *Triodia wiseana*, *T. angusta* hummock grassland.

Clearing Description	Hardy River Borefield Project. Hamersley Iron Pty Ltd proposes to clear up to 90 hectares of native vegetation within a boundary of approximately 5,922 hectares, for the purpose of construction and operation of a borefield, pipelines and associated activities. The project is located approximately 10 kilometres west of Tom Price, within the Shire of Ashburton.
Vegetation Condition	Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994): To Completely Degraded: No longer intact; completely/almost completely without native species (Keighery, 1994).
Comment	The vegetation condition was derived from an amalgamated vegetation survey produced by Hamersley (2018) Iron Pty Ltd.

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 area lies within the Hamersley sub-region of the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). The vegetation within this sub-region is characterised as 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>According to Hamersley (2018) Iron Pty Ltd, a total of 28 vegetation types were identified across three major landforms over the application area: seven vegetation types were described from stony hills and slopes; 12 vegetation types were described from stony plains and low spurs; and nine vegetation types were described from creeklines, flowlines, floodplains and gullies.</p> <p>A total of 284 taxa from 120 genera representing 44 families have been recorded from the sampling sites in the study area (Hamersley, 2018). This total suggests that the study area is less species-rich than other areas in the locality (Hamersley, 2018). While this may in part reflect the absence of large ranges of hills, which do tend to yield substantial numbers of additional species, it is also likely that additional opportunistic records in the study area have not been accounted for (Hamersley, 2018).</p> <p>No Threatened Flora or Threatened or Priority Ecological Communities have been recorded within the application area (Hamersley, 2018; GIS Database).</p> <p>The vegetation surveys recorded six Priority Flora species within the application area:</p> <ul style="list-style-type: none"> • <i>Bothriochloa decipiens</i> var. <i>cloncurransis</i> (Priority 1); • <i>Goodenia pedicellata</i> (Priority 1); • <i>Sida</i> sp. Hamersley Range (K. Newbey 10692) (Priority 1);
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- *Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727) (Priority 3);
- *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) (Priority 3); and
- *Sida* sp. Barlee Range (S. van Leeuwen 1642) (Priority 3).

Given the small number of collections of the Priority 1 flora species *Bothriochloa decipiens* var. *cloncurrans*, and the large proportion of the known records of the Priority 1 *Goodenia pedicellata* within the application area, the locations of these species will be designated as internal Rio Tinto significant areas (Hamersley, 2018). In addition, the locations of the Priority 3 species, *Goodenia* sp. East Pilbara (A.A. Mitchell) PRP 727 should also be considered as significant areas, due to the possibility that they may also belong to *Goodenia pedicellata*, and so may also be of regional significance. Potential impacts to these Priority flora species may be minimised by the implementation of a flora management condition. The populations of the three remaining species are not considered to be of particular significance, as the species are widely distributed and were represented by only one or a few individuals within the application area (Hamersley, 2018).

No conservation significant fauna species were recorded within the application area during the fauna field survey (Hamersley, 2018). The fauna habitats present within the application area are common and widespread in the region, and with portions of the application area considered to be in a degraded nature due to past mining operations and pastoral activities (Hamersley, 2018).

A total of 17 introduced flora species (weeds) have been recorded from the study area. The majority of the weed species were recorded from areas that had been heavily grazed by cattle or were near water points or drainage features (Hamersley, 2018). Weeds have the potential to alter the biodiversity of an area, competing with native vegetation for available resources and making areas more fire prone. This can in turn lead to greater rates of infestation and further loss of biodiversity if the area is subject to repeated fires. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

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

Methodology CALM (2002)
Hamersley (2018)

GIS Database:

- IBRA Australia
- Pre-European Vegetation
- Threatened and Priority Flora
- Threatened and Priority Ecological Communities Boundaries
- Threatened and Priority Ecological Communities Buffers
- Threatened Fauna

(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**

The following ten fauna habitats have been recorded within the application area (Hamersley, 2018):

- Hillslope - *Eucalyptus leucophloia* woodland over *Acacia* spp. shrubland over *Triodia* hummock grassland on spurs and hill slopes.
- Hillslope - Mulga and *Acacia* shrublands over *Triodia* hummock grasslands on rocky hill slopes.
- Plain - *Acacia xiphophylla* shrubland over *Triodia* hummock grassland on clay plains.
- Plain - *Corymbia* spp. open woodland over mixed *Acacia* spp. shrubland over tussock grasslands on low hills and stony plains.
- Plain - Eucalypt woodland over *Acacia* spp. shrubland over *Triodia* hummock grassland on stony plains and slopes.
- Major Drainage - Eucalypt woodland over *Acacia citrinoviridis* shrubland in major creeks.
- Minor Drainage - *Acacia* spp. tall shrubland over *Cenchrus ciliaris* tussock grassland in minor drainages and flowlines.
- Minor Drainage - Eucalypt woodland over *Acacia* spp. shrubland over tussock grassland in minor drainages.
- Minor Drainage - Eucalypt woodland over *Acacia* spp. shrubland over *Triodia* hummock grassland in incised flowlines.
- Gully - *Eucalyptus leucophloia* over Mulga (*Acacia aneura*) / *Acacia citrinoviridis* over *Triodia* hummock grassland in gullies and gorges.

None of the fauna habitats occurring within the application area correspond to any ecosystems listed as Threatened under the EPBC Act and none are consistent with ecosystems listed as TECs by the DBCA (Hamersley, 2018, GIS Database).

Two of the 11 habitats mapped within the study area represent preferred habitat for a number of conservation significant species that could potentially occur within the study area, in particular the Northern Quoll

(Endangered), and the Pilbara Olive Python (Vulnerable), Ghost Bat (Vulnerable) and Pilbara Leaf-nosed Bat (Vulnerable) (Hamersley, 2018; Western Australian Herbarium, 1998 -). These habitats are:

- Eucalypt woodland over *Acacia citrinoviridis* shrubland in major creeks; and
- *Eucalyptus leucophloia* over Mulga (*Acacia aneura*) / *Acacia citrinoviridis* over *Triodia* hummock grassland in gullies and gorges.

While fauna species may utilise the habitats within the application area, neither the landforms nor vegetation types represent core habitat for any indigenous fauna as both the habitats and the fauna species are widespread in the local area and region (Hamersley, 2018).

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

Methodology Hamersley (2018)
Western Australian Herbarium (1998 -).

GIS Database:
- Imagery
- Pre-European Vegetation
- Threatened Fauna

(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

There are no known records of Threatened flora within the application area (GIS Database). Flora surveys of the application area did not record any species of Threatened flora (Hamersley, 2018).

The vegetation associations within the application area are common and widespread within the region (Hamersley, 2018; GIS Database), and the vegetation proposed to be cleared is unlikely to be necessary for the continued existence of any species of Threatened (rare) flora.

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

Methodology Hamersley (2018)

GIS Database:
- Pre-European Vegetation
- 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

There are no known Threatened Ecological Communities (TECs) located within or in close proximity to the application area (GIS Database). The nearest known TEC is the Themeda grasslands TEC buffer, located approximately 40 kilometres north-east of the application area (GIS Database).

A flora and vegetation survey of the application area did not identify any TECs (Hamersley, 2018).

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

Methodology Hamersley (2018)

GIS Database:
- Threatened and Priority Ecological Communities Boundaries
- Threatened and Priority Ecological Communities Buffers

(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 Bioregion of the Interim Biogeographic Regionalisation for Australia (IBRA) (GIS Database). Approximately 99% of the pre-European vegetation still exists in the IBRA Pilbara Bioregion (Government of Western Australia, 2018). The application area is broadly mapped as Beard vegetation associations 82: Hummock grasslands, low tree steppe; snappygum over *Triodia wiseana*; and 567: Hummock grasslands, shrub steppe; mulga and kanji over soft spinifex & *Triodia base* (GIS Database). Approximately 99% of the pre-European extent of each of these vegetation associations remains uncleared at both the state and bioregional level (Government of Western Australia, 2018).

Therefore, the application area does not represent a significant remnant of native vegetation in an area that has been extensively cleared.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in DBCA managed lands
IBRA Bioregion – Pilbara	17,808,657	17,733,583	~99.58	Least Concern	10.12
Beard vegetation associations – WA					
82	19,892,306	19,843,729	~99.76	Least Concern	6.62
567	777,507	774,896	~99.66	Least Concern	25.38
Beard vegetation associations – Pilbara Bioregion					
82	2,563,583	2,550,899	~99.51	Least Concern	11.59
567	776,824	774,213	~99.66	Least Concern	25.49

* Government of Western Australia (2018)

** 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 (2018)

GIS Database:

- IBRA Australia
- 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).

Two vegetation units were identified as growing in association with a watercourse within the application area (Hamersley, 2018). These vegetation units were found growing along drainage lines within the application area. Hamersley (2018) 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.

Based on the above, the proposed clearing is at variance to this Principle. Potential impacts to vegetation growing in association with the watercourse may be minimised by the implementation of a watercourse management condition.

Methodology Hamersley (2018)

GIS Database:

- Hydrography, 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 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, 2018).

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

Methodology BoM (2018)
Van Vreeswyk et al. (2004)

GIS Database:
- Landsystem Rangelands
- Soils, Statewide

(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

There are no conservation areas in the vicinity of the application area. The nearest DBCA (formerly DPaW) managed land is Karijini National Park which is located approximately 23 kilometres east of the application area (GIS Database). The proposed clearing is unlikely to impact on 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:
- DPaW 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

There are no Public Drinking Water Source Areas within or in close proximity to the application area (GIS Database). There are no permanent watercourses or wetlands within the area proposed to clear (GIS Database). Creek lines in the region are dry for most of the year, only flowing briefly immediately following significant rainfall. The proposed clearing is unlikely to result in significant changes to surface water flows.

The proposed clearing is unlikely to cause deterioration in the quality of underground water. 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.

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

Methodology GIS Database:
- 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 application area is located within the Ashburton River catchment area (GIS Database). Given the size of the area to be cleared (90 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 398 millimetres and an average evaporation rate of approximately 3,400 millimetres there is likely to be little surface flow during normal seasonal rains (BoM, 2018; 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 (2018)

GIS Database:
- Hydrographic Catchments - Catchments

- Hydrography, linear

Planning Instrument, Native Title, previous EPA decision or other matter.

Comments

The clearing permit application was advertised on 15 October 2018 by the Department of Mines, Industry Regulation and Safety (DMIRS), inviting submissions from the public. No submissions were received in relation to this application.

There are two native title claims over the area under application (DPLH, 2018). These claims have been registered with the National 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*.

There are no registered Aboriginal Sites of Significance within the application area (DPLH, 2018). 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 Water and Environmental Regulation and the Department of Biodiversity Conservation and Attractions, 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 DPLH (2018)

4. References

- BoM (2018) Bureau of Meteorology Website – Climate Data Online, Tom Price. Bureau of Meteorology. <http://www.bom.gov.au/climate/data/> (Accessed 19 November 2018).
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002. Department of Conservation and Land Management, Western Australia.
- DPLH (2018) Aboriginal Heritage Enquiry System. Department of Planning, Lands and Heritage. <http://maps.daa.wa.gov.au/AHIS/> (Accessed 19 November 2018).
- 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 (2018) 2017 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of December 2017. WA Department of Biodiversity, Conservation and Attractions. <https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics>
- Hamersley (2018) Flora, Vegetation and Fauna Habitat Assessment at Hardy River Borefield, Native Vegetation Clearing Permit Supporting Report. Prepared by Rio Tinto, 29 June 2018.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- 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 (1998 -). FloraBase - the Western Australian Flora. Department of Biodiversity, Conservation and Attractions. <https://florabase.dpaw.wa.gov.au/> (Accessed 19 November 2018).

5. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government
DAA	Department of Aboriginal Affairs, Western Australia (now DPLH)
DAFWA	Department of Agriculture and Food, Western Australia (now DPIRD)
DBCA	Department of Biodiversity Conservation and Attractions, Western Australia
DEC	Department of Environment and Conservation, Western Australia (now DBCA and DWER)
DEE	Department of the Environment and Energy, Australian Government
DER	Department of Environment Regulation, Western Australia (now DWER)
DMIRS	Department of Mines, Industry Regulation and Safety, Western Australia
DMP	Department of Mines and Petroleum, Western Australia (now DMIRS)
DPIRD	Department of Primary Industries and Regional Development, Western Australia
DPLH	Department of Planning, Lands and Heritage, Western Australia
DRF	Declared Rare Flora
DoE	Department of the Environment, Australian Government (now DEE)
DoW	Department of Water, Western Australia (now DWER)
DPaW	Department of Parks and Wildlife, Western Australia (now DBCA)

DSEWPac	Department of Sustainability, Environment, Water, Population and Communities (now DEE)
DWER	Department of Water and Environmental Regulation, Western Australia
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
TEC	Threatened Ecological Community

Definitions:

{DPaW (2017) Conservation Codes for Western Australian Flora and Fauna. Department of Parks and Wildlife, Western Australia}:-

T	<p>Threatened species: Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, listed under Schedules 1 to 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora).</p> <p>Threatened fauna is that subset of ‘Specially Protected Fauna’ declared to be ‘likely to become extinct’ pursuant to section 14(4) of the <i>Wildlife Conservation Act 1950</i>.</p> <p>Threatened flora is flora that has been declared to be ‘likely to become extinct or is rare, or otherwise in need of special protection’, pursuant to section 23F(2) of the <i>Wildlife Conservation Act 1950</i>.</p> <p>The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.</p>
CR	<p>Critically endangered species Threatened species considered to be facing an extremely high risk of extinction in the wild. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.</p>
EN	<p>Endangered species Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.</p>
VU	<p>Vulnerable species Threatened species considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.</p>
EX	<p>Presumed extinct species Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora.</p>
IA	<p>Migratory birds protected under an international agreement Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice.</p>
CD	<p>Conservation dependent fauna Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice.</p>
OS	<p>Other specially protected fauna</p>

Fauna otherwise in need of special protection to ensure their conservation. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.

P Priority species

Species which are poorly known; or

Species that are adequately known, are rare but not threatened, and require regular monitoring. Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

P1 Priority One - Poorly-known species:

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

P2 Priority Two - Poorly-known species:

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

P3 Priority Three - Poorly-known species:

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations 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 locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

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 are close to qualifying for Vulnerable, but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.