



# Clearing Permit Decision Report

## 1. Application details and outcomes

### 1.1. Permit application details

<b>Permit number:</b>	9977/1
<b>Permit type:</b>	Purpose Permit
<b>Applicant name:</b>	Industrial Minerals Ltd
<b>Application received:</b>	21 November 2022
<b>Application area:</b>	4.25 hectares
<b>Purpose of clearing:</b>	Silica Sand Mining
<b>Method of clearing:</b>	Mechanical Removal
<b>Tenure:</b>	Mining Lease 70/1417 Miscellaneous Licence 70/237 Miscellaneous Licence 70/238
<b>Location (LGA area/s):</b>	Shire of Coorow
<b>Colloquial name:</b>	Warradarge Silica Sand Project

### 1.2. Description of clearing activities

Industrial Minerals Ltd proposes to clear up to 4.25 hectares of native vegetation within a boundary of approximately 484 hectares, for the purpose of silica sand mining. The project is located approximately 24.5 kilometres south of the town of Eneabba, within the Shire of Coorow.

The application is to allow for the development of a silica sand mining project via a series of shallow surface excavations and construction of associated mine infrastructure.

### 1.3. Decision on application and key considerations

<b>Decision:</b>	Grant
<b>Decision date:</b>	10 January 2023
<b>Decision area:</b>	4.25 hectares of native vegetation

### 1.4. Reasons for decision

This clearing permit application was made in accordance with section 51E of the *Environmental Protection Act 1986* (EP Act) and was received by the Department of Mines, Industry Regulation and Safety (DMIRS) on 21 November 2022. DMIRS advertised the application for a public comment for a period of 21 days, and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (Appendix A), relevant datasets (Appendix E), the results of a flora and vegetation survey (Appendix D), the clearing principles set out in Schedule 5 of the EP Act (Appendix B), proposed avoidance and minimisation measures (Section 3.1), relevant planning instruments and any other matters considered relevant to the assessment (Section 3.3).

The assessment identified that the proposed clearing may result in:

- the potential introduction and spread of weeds and dieback into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values; and
- potential land degradation in the form of wind erosion.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing can be minimised and managed to be unlikely to lead to an unacceptable risk to environmental values.

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid, minimise to reduce the impacts and extent of clearing;
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback; and
- commence construction no later than three months after undertaking clearing to reduce the risk of erosion.

## 2. Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Mining Act 1978* (WA)

Relevant agreements (treatys) considered during the assessment include:

- Japan-Australia Migratory Bird Agreement
- China-Australia Migratory Bird Agreement
- Republic of Korea-Australia Migratory Bird Agreement

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2014)
- *Procedure: Native vegetation clearing permits* (DWER, October 2021)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)

## 3. Detailed assessment of application

### 3.1. Avoidance and mitigation measures

The proponent has designed the application area to intentionally avoid large areas of intact native vegetation (Industrial Minerals, 2022). The following mitigation measures, among others will be implemented as outlined in the Warradarge Project Mine Closure Plan and the Warradarge Project Mining Proposal (Clark Lindbeck, 2022a; 2022b):

- imposing speed limits, restricting the movement of heavy vehicles, and spraying water to control dust;
- hygiene measures will be implemented to prevent the spread of weeds and dieback;
- run-of-mine areas will be bunds/drains to prevent surface flows to go through these areas;
- all surface runoff from the product stockpile area and within the plant area will be directed to sumps;
- daily inspections of ponds to detect fauna trapped in the ponds;
- site induction to include native fauna awareness while driving, including instructions to follow speed limits implemented;
- soil erosion control banks will be built where excess runoff may concentrate and there is a potential for soil erosion;
- progressive rehabilitation of mined areas during operations; and
- pasture seeding or cropping seeding as soon as possible after topsoil replaced.

The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values.

### 3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix A) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles identified that the impacts of the proposed clearing present a risk to biological values (fauna and vegetation) and significant remnant vegetation. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

#### 3.2.1. Biological values (priority flora and conservation significant fauna) - Clearing Principles (a) and (b)

##### Assessment

There were three Priority flora species recorded within the application area by Williams & Son (2022a; 2022b; 2022c). The species recorded are listed below:

- *Loxocarya gigas* (P2)
- *Jacksonia anthoclada* (P3)
- *Grevillea rudis* (P4)

There was a total of 30 individuals of the species *Loxocarya gigas* recorded within the application area (Clark Lindbeck, 2022c). Western Australian Herbarium (1998-) records indicate that *L. gigas* is not restricted to the application area and that its distribution extends across two IBRA Bioregions. Some of the records of *L. gigas* in the Western Australian Herbarium (1998-) are located inside of nature reserves. In addition to the records from the Western Australian Herbarium (1998-), Williams & Son (2022b) recorded four new populations of *L. gigas*, which are located in fenced off areas of native vegetation located outside of the application area.

There was a total of 10 individuals of *Jacksonia anthoclada* recorded within the application area (Clark Lindbeck, 2022c). Western Australian Herbarium (1998-) records indicate that *J. anthoclada* is not restricted to the application area and that its distribution extends across three local government areas. Additionally, several of the records of *J. anthoclada* in the Western Australian Herbarium (1998-) database are located within nature reserves.

There were seven individuals of *Grevillea rudis* recorded within the application area (Clark Lindbeck, 2022c). Western Australian Herbarium (1998-) records indicate that *G. rudis* is not restricted to the application area and that its distribution extends across three IBRA Regions and several local government areas. Additionally, some of the records of *G. rudis* in the Western Australian Herbarium (1998-) database are located within nature reserves.

The fork-tailed swift was identified as possible to occur within the application area (Western Ecological, 2022). There were only two records of this species in the DBCA threatened fauna database, one about 20 kilometres northwest of the survey area and the other about 35 kilometres southeast of the survey area (Western Ecological, 2022). The proposed clearing is unlikely to impact the fork-tailed swift, as this species is not likely to be reliant on habitats in the survey area, but may visit them as part of its larger foraging home range (Western Ecological, 2022). Furthermore, it is somewhat independent of terrestrial habitats as it forages aerially high above the tree canopy (Western Ecological, 2022).

The Carnaby's cockatoo has been previously recorded within the application area (Western Ecological, 2022). There were hundreds of records of this species in the DBCA threatened fauna database in the region, including one in the survey area (northern end) and three adjacent to the survey area (Western Ecological, 2022). There is limited foraging habitat (Coastal Blackbutt) in a degraded condition in areas proposed to be cleared (Western Ecological, 2022). Additionally, there are large areas of foraging habitat in the local and broader region (Western Ecological, 2022). Potential nesting habitat is unlikely to be present in areas proposed to be disturbed given that there are no nesting tree species within the application area (Western Ecological, 2022). The proposed clearing is not likely to impact foraging, roosting or breeding habitat of Carnaby's cockatoo given there is very limited foraging habitat which is in a degraded condition and roosting or breeding habitat is non-existent in areas proposed to be cleared (Western Ecological, 2022).

Given the mobility of fauna species, the majority of clearing for mining being individual native species and the lineal nature of the proposed clearing (for road access to the site), it is considered the proposed clearing is unlikely to have a significant impact on conservation significance of fauna species (Clark Lindbeck, 2022c).

#### Conclusion

For the reasons set out above, it is considered that the impacts of the proposed clearing on priority flora, and fauna is not likely to represent a significant residual impact.

#### Conditions

No fauna or vegetation management conditions required.

### 3.2.2. Significant remnant vegetation – Clearing Principle (e)

#### Assessment

Given the current vegetation extent (refer to section A.2) of vegetation association 379, it does not meet the current objective of the EPA to retain at least 30 per cent of the pre-clearing extent of each ecological community (Government of Western Australia, 2019). However, 3 hectares of the proposed clearing is in a degraded condition and has been previously disturbed by agricultural activities. The remaining vegetation that is considered to be in good condition is comprised of a majority of weeds (Clark Lindbeck, 2022c). The application area has also been used for stock grazing and agricultural cropping as it is an active cattle and wheat farm (Western Ecological, 2022). Additionally the application area is located in an area mapped as a dieback risk zone (GIS Database). There are many other areas around the application area that contain native vegetation in much better condition and could be considered a significant remnant vegetation of the region, including two roadside reserves located less than 1 kilometre away from the application area (GIS Database). Therefore, the vegetation in the application area is unlikely to be significant as a remnant of native vegetation.

#### Conclusions

For the reasons set out above, it is considered that the impacts of the proposed clearing on significant remnant vegetation is not likely to represent a significant residual impact.

#### Conditions

In order to preserve the small areas of native vegetation considered to be in good condition, a condition to take hygiene measures to prevent the spread of weeds and dieback will be placed on the clearing permit.

### 3.3. Relevant planning instruments and other matters

The clearing permit application was advertised on 9 December 2022 by the Department of Mines, Industry Regulation and Safety inviting submissions from the public. No submissions were received in relation to this application.

The permit area is within the South West Native Title Settlement area (DPLH, 2022). This settlement resolves Native Title rights and interests over an area of approximately 200,000 square kilometres within the south west of Western Australia. 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, 2022). 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.

Other relevant authorisations required for the proposed land use include:

- A Mining Proposal / Mine Closure Plan approved under the *Mining Act 1978*.

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.

**End**

## Appendix A. Site characteristics

### A.1. Site characteristics

Characteristic	Details
Local context	The area proposed to be cleared is part of a 1,106 hectare isolated patch of native vegetation in the intensive land use zone of Western Australia. It is surrounded by other patches of native vegetation and it is adjacent to a road (southern side of the application area). The proposed clearing area is located on predominantly cleared agricultural land.
Ecological linkage	According to available databases and aerial imagery, the proposed clearing does not form part of any known or mapped ecological linkages.
Conservation areas	The application area is not located within any mapped conservation areas (GIS Database). Two un-named nature reserves are located in proximity to the application area (GIS Database). One nature reserve is located 650 metres west while the other one is located 800 metres east of the application area respectively (GIS Database).
Vegetation description	<p>The vegetation of the application area is broadly mapped as the following Beard vegetation associations:</p> <p>379: Shrublands; scrub-heath on lateritic sandplain in the central Geraldton Sandplain Region; and            1031: Mosaic: Shrublands; hakea scrub-heath / Shrublands; dryandra heath (GIS Database).</p> <p>A flora and vegetation survey was conducted over the application area by Williams &amp; Son (2022a; 2022b; 2022c) during May to September, 2022. The following vegetation associations were recorded within the application area (Williams &amp; Son, 2022a; 2022b; 2022c):</p> <ul style="list-style-type: none"> <li>• Cleared agricultural land for cropping and active stock grazing.</li> <li>• Areas planted for Tagasaste (<i>Chamaecytisus palmensis</i>), an exotic grazing shrub.</li> <li>• Intentionally planted trees (<i>Eucalyptus cladocalyx</i>, <i>E. gomphocephala</i>, <i>Acacia acuminata</i>)</li> <li>• Native vegetation - Isolated trees (predominantly <i>Eucalyptus todtiana</i> (blackbutt) and <i>Nuytsia floribunda</i>) and small patches of regrowth of native vegetation on M70/1417 (previously cleared); native vegetation on L70/237 and L70/238.</li> </ul>
Vegetation condition	<p>The vegetation surveys (Williams &amp; Son, 2022a; 2022b; 2022c) and aerial imagery indicate the vegetation within the proposed clearing area is in Completely Degraded to Very Good (Keighery, 1994) condition.</p> <p>The full Keighery (1994) condition rating scale is provided in Appendix C.</p>
Climate and landform	The application area is located in an area classified as winter dominant, characterised by wet winters and dry summers with an average annual rainfall of 532.9 millimetres (BoM, 2022).
Soil description	The soil is mapped as soil unit Wd9. This soil unit is described as broad valleys and undulating interfluvial areas with some discontinuous breakaways and occasional mesas; lateritic materials mantle the area: chief soils are sandy acidic yellow mottled soils, containing much ironstone gravel in the A horizons forming a complex pattern with lateritic sandy gravels. Associated are leached sands underlain by lateritic gravels and mottled clays that occur at a progressively greater depth down slope (Northcote et al., 1960-68).
Land system and land degradation risk	The application area is mapped by the Department of Primary Industries and Regional Development (DPIRD) as the Yerramullah land system. This application is described as subdued dissected lateritic plateau, undulating low hills and rises on lateritised weathered sandstone. Pale deep sand, sandy gravels and yellow deep sand. Banksia woodlands on lower slopes / depressions, heathlands elsewhere (DPIRD, 2022). Due to the presence of sandy soils this land system is moderately susceptible to wind erosion.
Waterbodies	Aerial imagery indicate that four minor, non-perennial watercourses transect the area proposed to be cleared (GIS Database).
Hydrogeography	The application area falls within the Arrowsmith Groundwater Area legislated by the <i>RIWI Act 1914</i> (GIS Database). The mapped salinity of the groundwater is different on the east and west side of the application area (GIS Database). The west side of the application area has a mapped salinity of 1,000-3,000 milligrams per litre total dissolved solids which is described as brackish to saline (GIS Database). The east side of the application area has a mapped salinity of 500-1,000 milligrams per litre total dissolved solids which is described as marginal (GIS Database).
Flora	There were three Priority flora species recorded in the application area by Williams & Son (2022a; 2022b; 2022c).

Characteristic	Details
Ecological communities	The application area is not located within any known or mapped Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs) (GIS Database). The closest record of a PEC is approximately 8.1 kilometres southwest of the application area (GIS Database). The closest record of a TEC is approximately 10.1 kilometres north of the application area (GIS Database).
Fauna	A desktop assessment performed by Western Ecological (2022) found one Threatened species has been recorded within the application area and one Migratory species is considered as possible to occur within the application area.

## A.2. Vegetation extent

	Pre-European area (ha)	Current extent (ha)	Extent Remaining %	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA Managed Lands
IBRA Bioregion - Geraldton Sandplains	3,136,038	1,404,424	~45	568,255	~18
IBRA Subregion - Lesueur Sandplain	1,171,775	502,977	~43	212,498	~18
Local Government – Shire of Coorow	418,948	166,708	~40	72,459	~17
Beard vegetation associations - State					
379	547,737	129,737	~24	28,918	~5
1031	269,491	88,668	~33	37,827	~14
Beard vegetation associations - Bioregion					
379	546,507	129,496	~24	28,903	~5
1031	241,350	83,217	~34	37,048	~15
Beard vegetation associations - Subregion					
379	370,030	111,632	~30	21,506	~6
1031	241,350	83,217	~34	37,048	~15

Government of Western Australia (2019)

## A.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix E.1), and biological survey information, impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features ? [Y/N]	Total individuals recorded (application area)	Number of known records (total)	Distance of closest record to application area (km)	Are surveys adequate to identify? [Y, N, N/A]
<i>Loxocarya gigas</i>	P2	Y	30	34	0 km	Y
<i>Jacksonia anthoclada</i>	P3	Y	10	26	0 km	Y
<i>Grevillea rudis</i>	P4	Y	7	70	0 km	Y

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

(Williams & Son, 2022a; 2022b; 2022c)

#### A.4. Land degradation risk table

Risk categories	Land Unit 1
Wind erosion	M1: 86% of the map unit has a high to extreme hazard
Water erosion	L1: 0% of the map unit has a very high to extreme hazard
Salinity	L1: 0% of the map unit has a moderate or high hazard or is presently saline
Subsurface Acidification	H2: 100% of the map unit has a high susceptibility or is presently acid
Flood risk	L1: 0% of the map unit has a moderate to high hazard
Water logging	L1: 0% of the map unit has a moderate to very high to risk
Phosphorus export risk	M1: 18% of the map unit has a high to extreme hazard

(DPIRD, 2022)

#### Appendix B. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
<b>Environmental value: biological values</b>		
<p><b>Principle (a):</b> <i>“Native vegetation should not be cleared if it comprises a high level of biodiversity.”</i></p> <p><u>Assessment:</u></p> <p>The proposed clearing is located in an area that has been extensively cleared for agriculture and is not considered to comprise a high level of biodiversity. Three priority flora species were recorded within the application area (Williams &amp; Son 2022a; 2022b; 2022c). The Carnaby’s cockatoo has been previously recorded within the application area (Western Ecological, 2022).</p> <p>Fourteen weed species were located in the application area (Williams &amp; Son 2022a; 2022b). None of these species are Declared Pests or Weeds of National Significance. Given the nature of native vegetation occurrence in the application area as isolated trees and areas of regrowth with no understorey, these were considered ‘Not Interpretable’ for dieback (Clark Lindbeck, 2022c).</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><b>Principle (b):</b> <i>“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.”</i></p> <p><u>Assessment:</u></p> <p>The proposed clearing is not expected to have a significant impact on Carnaby’s cockatoo or the fork-tailed swift as there is limited foraging habitat and no breeding habitat present in the application area (Clark Lindbeck, 2022c). The intentionally planted Eucalypts and Acacias are not likely to be impacted by the proposed clearing (Clark Lindbeck, 2022c).</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><b>Principle (c):</b> <i>“Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</i></p> <p><u>Assessment:</u></p> <p>There are no records of threatened flora within the application area (GIS Database). Surveys conducted by Williams &amp; Son (2022a; 2022b; 2022c) did not record any threatened flora in the application area.</p>	Not likely to be at variance	No
<p><b>Principle (d):</b> <i>“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.”</i></p> <p><u>Assessment:</u></p> <p>The application area does not fall within any known or mapped Threatened Ecological Communities (Clark Lindbeck, 2022c; GIS Database).</p>	Not likely to be at variance	No
<b>Environmental value: significant remnant vegetation and conservation areas</b>		
<p><b>Principle (e):</b> <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment:</u></p> <p>The application area falls within the Lesueur Sandplain subregion of the Geraldton Sandplains bioregion of the Interim Biogeographic Regionalisation for Australia (GIS Database). Approximately 45 per cent of the pre-European vegetation still exists in the</p>	May be at variance	Yes <i>Refer to Section 3.2.2, above.</i>

Assessment against the clearing principles	Variance level	Is further consideration required?
<p>Geraldton Sandplains bioregion (Government of Western Australia, 2019). The application area is broadly mapped as Beard vegetation associations 379 and 1031 (GIS Database). Vegetation association 379 has been extensively cleared as approximately 24 per cent of the pre-European vegetation extent remains at both state and bioregional level and approximately 30 per cent remains at subregional level (Government of Western Australia, 2019). Vegetation association 1031 maintains approximately 33 per cent of the pre-European vegetation extent at state level and approximately 34 per cent at bioregional and subregional level (Government of Western Australia, 2019). The full vegetation extent can be found in section A.2.</p>		
<p><u>Principle (h):</u> <i>“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></p> <p><u>Assessment:</u></p> <p>There are two nature reserves located less than one kilometre from the application area (GIS Database). The potential impact from the proposed clearing to the nearby nature reserves is the spread of weeds and dieback from the proposed clearing to the nature reserves. Weed control and hygiene conditions will minimise this impact. Given the conditions in place, the proposed clearing is not likely to have an impact on the environmental values of the nearby conservation areas.</p>	Not likely to be at variance	No
<b>Environmental value: land and water resources</b>		
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u></p> <p>GIS Databases indicate that there are four drainage lines within the application area. However, the application area has been extensively cleared for agricultural purposes and these drainage lines are no longer well defined (GIS Database). The proposed clearing is unlikely to impact vegetation growing in association with a watercourse.</p>	Not likely to be at variance	No
<p><u>Principle (g):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment:</u></p> <p>Given the characteristics of the land systems (see section A.1) where the application area is located, the mapped soils are highly susceptible to wind erosion (DPIRD, 2022). Noting the location of the application area, the proposed clearing is likely to have an appreciable impact on land degradation. A staged clearing condition can minimise wind erosion by preventing cleared areas from being exposed for long periods of time.</p>	May be at variance	No
<p><u>Principle (i):</u> <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.”</i></p> <p><u>Assessment:</u></p> <p>Given no permanent water courses, wetlands, or Public Drinking Water Source Areas are recorded within the application area, the proposed clearing is unlikely to impact surface or ground water quality (GIS Database).</p>	Not likely to be at variance	No
<p><u>Principle (j):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</i></p> <p><u>Assessment:</u></p> <p>Given no permanent water courses or wetlands are recorded within the application area, the proposed clearing is unlikely to cause, or exacerbate, the incidence or intensity of flooding (GIS Database).</p>	Not likely to be at variance	No

### Appendix C. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation’s ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.



Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

**Measuring vegetation condition for the South West and Interzone Botanical Province (Keighery, 1994)**

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

**Appendix D. Photographs of the vegetation**



**Vegetation in good condition containing weeds**



**Degraded vegetation where cattle is present**

**E.1. GIS databases**

Publicly available GIS Databases used (sourced from [www.data.wa.gov.au](http://www.data.wa.gov.au)):

- Aboriginal Heritage Places (DPLH-001)
- Clearing Regulations – Schedule One Areas (DWER-057)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Environmentally Sensitive Areas (DWER-046)
- Groundwater Salinity Statewide (DWER-026)
- Hydrographic Catchments – Catchments (DWER-028)
- Hydrography – Inland Waters – Waterlines
- Hydrography, Linear (DWER-031)
- IBRA Vegetation Statistics
- Native Title (ILUA) (LGATE-067)
- Pre-European Vegetation Statistics
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Mapping – Best Available (DPIRD-027)
- Soil Landscape Mapping – Rangelands (DPIRD-064)
- WA Now Aerial Imagery

Restricted GIS Databases used:

- Black Cockatoo Carnabys Distribution
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

**E.2. References**

- BoM (2022) Bureau of Meteorology Website – Climate Data Online. Bureau of Meteorology. <http://www.bom.gov.au/climate/data/> (Accessed 15 December 2022).
- Clark Lindbeck (2022a) Warradarge Project Mine Closure Plan Prepared by Clark Lindbeck and Associates Pty Ltd. November 2022.
- Clark Lindbeck (2022b) Warradarge Project Mining Proposal Prepared by Clark Lindbeck and Associates Pty Ltd. November 2022.
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## 4. Glossary

### Acronyms:

<b>BC Act</b>	<i>Biodiversity Conservation Act 2016, Western Australia</i>
<b>BoM</b>	Bureau of Meteorology, Australian Government
<b>DAA</b>	Department of Aboriginal Affairs, Western Australia (now DPLH)
<b>DAFWA</b>	Department of Agriculture and Food, Western Australia (now DPIRD)
<b>DAWE</b>	Department of Agriculture, Water and the Environment, Australian Government
<b>DBCA</b>	Department of Biodiversity, Conservation and Attractions, Western Australia
<b>DER</b>	Department of Environment Regulation, Western Australia (now DWER)
<b>DMIRS</b>	Department of Mines, Industry Regulation and Safety, Western Australia
<b>DMP</b>	Department of Mines and Petroleum, Western Australia (now DMIRS)
<b>DoEE</b>	Department of the Environment and Energy (now DAWE)
<b>DoW</b>	Department of Water, Western Australia (now DWER)
<b>DPaW</b>	Department of Parks and Wildlife, Western Australia (now DBCA)
<b>DPIRD</b>	Department of Primary Industries and Regional Development, Western Australia
<b>DPLH</b>	Department of Planning, Lands and Heritage, Western Australia
<b>DRF</b>	Declared Rare Flora (now known as Threatened Flora)
<b>DWER</b>	Department of Water and Environmental Regulation, Western Australia
<b>EP Act</b>	<i>Environmental Protection Act 1986, Western Australia</i>
<b>EPA</b>	Environmental Protection Authority, Western Australia
<b>EPBC Act</b>	<i>Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)</i>
<b>GIS</b>	Geographical Information System
<b>ha</b>	Hectare (10,000 square metres)
<b>IBRA</b>	Interim Biogeographic Regionalisation for Australia
<b>IUCN</b>	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
<b>PEC</b>	Priority Ecological Community, Western Australia
<b>RIWI Act</b>	<i>Rights in Water and Irrigation Act 1914, Western Australia</i>
<b>TEC</b>	Threatened Ecological Community

### Definitions:

{DBCA (2019) Conservation Codes for Western Australian Flora and Fauna. Department of Biodiversity, Conservation and Attractions, Western Australia}:-

#### T **Threatened species:**

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

**Threatened fauna** is that subset of ‘Specially Protected Fauna’ listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

**Threatened flora** is that subset of ‘Rare Flora’ listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

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.

#### CR **Critically endangered species**

Threatened species considered to be “*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*”.

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

#### EN **Endangered species**

Threatened species considered to be “*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*”.

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

**VU**

**Vulnerable species**

Threatened species considered to be “*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*”.

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

**Extinct Species:**

**EX**

**Extinct species**

Species where “*there is no reasonable doubt that the last member of the species has died*”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

**EW**

**Extinct in the wild species**

Species that “*is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

**Specially protected species:**

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

**MI**

**Migratory species**

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes 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 fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

**CD**

**Species of special conservation interest (conservation dependent fauna)**

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

**OS**

**Other specially protected species**

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

**P** **Priority species:**

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species 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.

**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.
- (c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened 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 the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.