



# Clearing Permit Decision Report

## 1. Application details

### 1.1. Permit application details

Permit application No.: 9242/1  
Permit type: Purpose Permit

### 1.2. Proponent details

Proponent's name: Evolution Mining (Mungari) Pty Ltd

### 1.3. Property details

Property: Mining Lease 15/1827  
Mining Lease 15/1831  
Miscellaneous Licence 15/391  
Local Government Area: Shire of Coolgardie  
Colloquial name: Rayjax Project

### 1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
200		Mechanical removal	Mineral production and associated activities

### 1.5. Decision on application

Decision on Permit Application: Grant  
Decision Date: 23 June 2021

## 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 association (GIS Database):

9: Medium woodland; coral gum (*Eucalyptus torquata*) and goldfields blackbutt (*Eucalyptus lesouefii*).

There have been two flora surveys conducted over the permit area. A flora and vegetation survey was conducted by Botanica Consulting in October 2020 and covered the proposed pit and mining infrastructure in the west of the permit boundary along with adjacent areas of vegetation outside of the area. The other flora survey was conducted in August 2019 by Spectrum Ecology and covered the proposed mining area in the west of the permit boundary and the majority of the proposed haul road which runs to the east.

The Botanica Consulting (2021a) survey recorded three vegetation communities within the application area:

#### **Eucalyptus open woodland (clay-loam plain)**

CLP-EW1 - *Eucalyptus griffithsii* and *E. transcontinentalis* sparse woodland over *Acacia hemiteles* and *Exocarpos aphyllus* tall shrubland over *Scaevola spinescens*, *Senna artemisioides* subsp. *filifolia*, *Olearia muelleri* and *Ptilotus obovatus*. var *obovatus* low shrubland.

CLP-EW2 - *Eucalyptus salmonophloia* sparse woodland over *Acacia hemiteles* and *Eremophila scoparia* tall open shrubland over *Atriplex nummularia* and *A. vesicaria* open chenopod shrubland over *Frankenia setosa*, *Maireana erioclada* and *Olearia muelleri* low open shrubland.

#### **Eucalyptus open woodland (hillslope)**

HS-EW1 - *Eucalyptus torquata* and *E. clelandiorum* woodland over *Acacia colletioides*, *Eremophila interstans* subsp. *interstans* and *Allocasuarina campestris* tall open shrubland over *Acacia erinacea*, *Trymalium myrtillus* subsp. *myrtillus* and *Westringia rigida* open shrubland and *Triodia scariosa* sparse hummock grassland/ *Olearia muelleri* and *Ptilotus obovatus*. var *obovatus* low sparse shrubland.

There were also areas mapped as 'Completely Degraded (cleared vegetation)'.

The Spectrum Ecology (2019) flora survey recorded two vegetation types in the permit area:

iv: *Eucalyptus salubris*, *E. clelandiorum* (+/- *E. salmonophloia*) mid open woodland over *Eremophila scoparia* and *Senna artemisioides* ssp. *filifolia* mid open shrubland over *Atriplex* sp. and *Olearia muelleri* low open shrubland; and

vi: *Eucalyptus moderata*, *Eucalyptus oleosa* and *E. torquata* tall mallee woodland over *Eremophila pustulata* and *Eremophila interstans* ssp. *interstans* tall sparse shrubland over *Acacia erinacea*, *Senna artemisioides* ssp. *filifolia*, and *Atriplex vesicaria* low sparse shrubland.

<b>Clearing Description</b>	Rayjax Project. Evolution Mining (Mungari) Pty Ltd proposes to clear up to 200 hectares of native vegetation within a boundary of approximately 318.5 hectares, for the purpose of mineral production and associated activities. The project is located approximately 18.5 kilometres north of Coolgardie, within the Shire of Coolgardie.
<b>Vegetation Condition</b>	Pristine: No obvious signs of disturbance (Keighery, 1994);  to  Completely Degraded: No longer intact; completely/almost completely without native species (Keighery, 1994).
<b>Comment</b>	The vegetation condition was derived from vegetation surveys conducted by Botanica Consulting (2021a) and Spectrum Ecology (2019).  The Spectrum Ecology survey was a reconnaissance flora survey. This survey covered the majority of the application area along with the Castle Hill project and haul road from Burgundy to Cutters Hill project. The survey was conducted in August which is outside of the recommended survey period for the area of September to November (EPA, 2016). However, above average rainfall was received in the preceding three months and year which would indicate that growth conditions prior to the survey were optimal (Spectrum Ecology, 2019). Many species were observed flowering or fruiting during the survey so the survey timing was not likely to have an impact on the results of the survey (Spectrum Ecology, 2019).  The Botanica Consulting survey was a detailed flora and vegetation survey. Reduced rainfall was recorded in the months preceding the survey and no ephemeral species were present at the time of the survey (Botanica Consulting, 2021a).  The proposed clearing is for the construction and operation of the Rayjax open pit gold mine. The project will include an open pit, run of mine pad, waste rock landform, water dam and support buildings and infrastructure in the western area of the permit boundary and a haul road which runs east from this area.

### 3. Assessment of application against Clearing Principles

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

<b>Comments</b>	<p><b>Proposal is not likely to be at variance to this Principle</b></p> <p>The clearing permit application area is located within the Eastern Goldfields subregion of the Interim Biogeographic Regionalisation for Australia (IBRA) Coolgardie Bioregion (GIS Database). The Eastern Goldfields subregion is characterised by undulating plains interrupted by low hills and ridges, supporting mallees, <i>Acacia</i> thickets and shrub-heaths on sandplains, and diverse <i>Eucalyptus</i> woodlands around salt lakes, on ranges, and in valleys. Salt lakes support dwarf shrublands of samphire. The subregion is rich in endemic <i>Acacia</i> species (CALM, 2002).</p> <p>The application area falls within the area known as the Great Western Woodlands, which represents the largest and most intact eucalypt woodland remaining in southern Australia and is one of the best examples of its type in the world (DEC, 2010). The Great Western Woodlands covers a total area of approximately 16 million hectares, and is recognised for its flora and fauna species richness and high number of endemic flora species (DEC, 2010). However, at approximately 200 hectares in size, the clearing permit application area represents a very small portion of the area covered by the Great Western Woodlands, and the proposed clearing is unlikely to have any significant impact on the conservation values of the Great Western Woodlands.</p> <p>Vegetation types within the application area are dominated by open Eucalypt woodlands (Botanica Consulting, 2021a; Spectrum Ecology, 2019). Vegetation types described within the application area were all represented in surrounding areas, indicating a wider distribution. There are no records of any Threatened or Priority Ecological Communities (TEC/PEC) within the application area and the flora and vegetation surveys did not identify any vegetation communities which represent a TEC or PEC (Botanica Consulting, 2021a; Spectrum Ecology, 2019).</p> <p>The Botanica Consulting (2021a) flora survey recorded 65 flora taxa from 30 genera and 20 families. The Spectrum Ecology (2019) survey which covered a much larger area recorded 113 flora taxa from 49 genera and 28 families. No species of Threatened or Priority flora were recorded within the permit area (Botanica Consulting, 2021a; Spectrum Ecology, 2019). The Priority 2 species <i>Eremophila praecox</i> was considered to have a high likelihood of occurrence within the permit area due to vegetation type iv being known habitat for the species (Spectrum Ecology, 2019). This vegetation type was only recorded over a small section of the proposed haul road (approximately 15 hectares) (Spectrum Ecology, 2019). Given only a small amount of habitat is likely to be cleared, the proposed clearing is not likely to have a significant impact on this species.</p> <p>No species of weeds were recorded during the field assessment of the permit area (Botanica Consulting, 2021a; Spectrum Ecology, 2019). 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 introduction of weeds may be minimised by the implementation of a weed management condition.</p>
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The vegetation associations, fauna habitats and landform types present within the application area, are well represented in surrounding areas (Botanica Consulting, 2021a; Spectrum Ecology, 2019). The fauna habitat identified within the application area was mostly homogenous across the permit area and there was not a great diversity of microhabitats observed in the area (Botanica Consulting, 2021a; Spectrum Ecology, 2019; GIS Database). The application area is unlikely to represent an area of higher fauna diversity than surrounding areas, in either a local or regional context.

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

**Methodology** Botanica Consulting (2021a)  
CALM (2002)  
DEC (2010)  
Spectrum Ecology (2019)

GIS Database:

- Hydrography, linear
- IBRA Australia
- Imagery
- Pre-European Vegetation
- Threatened and Priority Ecological Communities Boundaries
- Threatened and Priority Ecological Communities Buffers
- Threatened and Priority Flora

**(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.**

**Comments Proposal may be at variance to this Principle**

A reconnaissance fauna survey was undertaken of the permit area and other projects in the local area (Spectrum Ecology, 2019). Observations of potential fauna habitat was also made during the flora survey undertaken by Botanica Consulting (2021a). The following two broad fauna habitats have been recorded within the application area (Botanica Consulting, 2021a; Spectrum Ecology, 2019):

- Eucalyptus woodland/mixed Eucalyptus woodland on clay-loam plain; and
- Eucalyptus woodland on hillslopes.

The Eucalyptus woodland on plains habitat covers the majority of the permit area (over 90%) (Botanica Consulting, 2021a; Spectrum Ecology, 2019). This habitat is widespread and has been recorded from other fauna surveys in the region (Spectrum Ecology, 2019). The Eucalyptus woodland on hillslopes habitat was associated with small hills which extend outside the permit area and was only marginally covered by the permit boundary (Botanica Consulting, 2021a; Spectrum Ecology, 2019).

Based on known records and the habitat present, there are several fauna species of conservation significance which have the potential to occur within the permit area. The species with the greatest possibility of being found within the permit area are: Arid Bronze Azure Butterfly (*Ogyris subterrestris petrina* - Critically Endangered), Malleefowl (*Leipoa occella* - Vulnerable), Grey Falcon (*Falco hypoleucos* - Vulnerable), Peregrine Falcon (*Falco peregrinus* - Other specially protected species) and Inland Hairstreak (*Jalmenus aridus* - Priority 1) (Botanica Consulting, 2021a; Spectrum Ecology, 2019).

The Malleefowl has been previously observed in the vicinity of the permit area, with an individual bird observed in 2018 crossing a track approximately 500 metres north of the proposed haul road section of the permit area (Phoenix Environmental Sciences, 2019). A disused mound was also found within the haul road section of the permit area (Phoenix Environmental Sciences, 2019). This mound showed no signs of recent usage as evidence of diggings of other species and disturbance from rainfall and surface water movement were present on the mound (Phoenix Environmental Sciences, 2019). There were a number of eggs fragments found within the mound which indicates that the mound has been successfully used in the past (Phoenix Environmental Services, 2019). Another disused Malleefowl mound has been recorded approximately one kilometre northwest of the permit area (Botanica Consulting, 2021a). It is estimated that the mound has not been used for at least 20 years (Botanica Consulting, 2021a). Suitable nesting habitat in the area is often sparse and patchy, however, the presence of an old mound with eggshells suggests that there are areas within the permit boundary that could be used for breeding. The other areas of vegetation within the permit area are likely to be used for foraging by this species. To reduce impacts on the Malleefowl, Evolution Mining (Mungari) Pty Ltd plans to implement a number of measures including monitoring active nests and removing inactive nests in higher risk areas such within the project footprint and within 50 metres of haul roads (Evolution Mining, 2021). Potential impacts to this species may be minimised by a fauna management condition requiring areas to be cleared are searched for Malleefowl mounds which are then avoided if clearing is occurring during the breeding season (1 September – 31 January).

The Arid Bronze Azure Butterfly (*Ogyris subterrestris petrina* – Critically Endangered) was considered to have a medium likelihood of occurring within the permit area (Spectrum Ecology, 2019). The Arid Bronze Azure Butterfly is associated with colonies of *Camponotus terebrans*, a sugar ant that is associated with smooth bark

Eucalyptus species. Smooth bark Eucalypt trees are present within the application area (*Eucalyptus salmonophloia* and *Eucalyptus salubris*) (Botanica Consulting, 2021a; Spectrum Ecology, 2019). This species is only known from two locations near Barbalin in the wheatbelt and near Lake Douglas approximately 25 kilometres southeast of the permit area (although no records have been recorded since 1993). Confirmation on the presence or absence of this species can only be determined by an appropriate survey. A targeted search for *Camponotus terebrans* near smooth bark Eucalypts within the permit area was undertaken in May 2021 (Botanica Consulting, 2021b). There were *Camponotus terebrans* observed near the base of a *Eucalyptus yilgarnensis* in the northwest corner of the permit area (Botanica Consulting, 2021b). There were less than 10 ants observed which suggests that there is only a small colony present in the area (Botanica Consulting, 2021b). The Arid Bronze Azure Butterfly requires large colonies of host ants to support it and it is not usually associated with *Eucalyptus yilgarnensis* however, the proponent has committed to avoiding the vegetation within 50 metres of the recorded location of the tree with the ant colony. Potential impacts to this species may be minimised by a condition which requires the vegetation within 50 metres of the *Camponotus terebrans* colony to be maintained.

The Inland Hairstreak was also considered to have a medium likelihood of occurrence in the permit area (Spectrum Ecology, 2019). Records of this species are restricted to historical sightings around Lake Douglas approximately 25 kilometres southeast of the permit area. The larvae of this butterfly are attended by the Froglet ant *Froggattella kirbii* and are known to feed on *Acacia tetragonophylla* and *Senna artemisioides* subsp. *xcoriacea*. Potential habitat is present within the permit area as *Acacia tetragonophylla* was recorded across the different vegetation communities (Botanica Consulting, 2021a). Confirmation on the presence or absence of this species can only be determined by an appropriate survey. A targeted search of the permit area was undertaken for the presence of *Froggattella kirbii* at suitable habitat trees. There were *Acacia tetragonophylla* identified during the search however, no *Froggattella kirbii* observed near the trees (Botanica Consulting, 2021b). Based on this, it is considered that there is a low likelihood of this species utilising the permit area.

The Grey Falcon and Peregrine Falcon may use the permit area as part of a larger home range. The habitat present is widespread in the region and is not likely to represent significant habitat for these species (Botanica Consulting, 2021a; Spectrum Ecology, 2019).

There were nine potential short range endemic (SRE) invertebrate fauna species recorded within the permit area (Spectrum Ecology, 2019). The species recorded consisted of four pseudoscorpions, one isopod, two millipedes and two snails (Spectrum Ecology, 2019). Due to only juvenile specimens being collected, one species of pseudoscorpion and one species of millipede could not be identified to species level (Spectrum Ecology, 2019). Records from other areas surveyed in the nearby area (15 kilometre radius) have also recorded six potential SRE species (Spectrum Ecology, 2019). This would indicate that these potential SREs are not likely to be confined to the permit area. Habitats known to support SRE species such as vine thickets, boulder piles, isolated hills, vegetated gullies and freshwater habitats were not recorded in the permit area. The vegetation communities within the permit area are contiguous and broadly distributed outside of the permit boundary which also reduces the likelihood of any SREs being confined to the permit area (Botanica Consulting, 2021a; Spectrum Ecology, 2019). The vegetation within the permit area is not likely to represent significant habitat for SRE species.

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

**Methodology** Botanica Consulting (2021a)  
 Botanica Consulting (2021b)  
 Evolution Mining (2021)  
 Phoenix Environmental Sciences (2019)  
 Spectrum Ecology (2019)

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, threatened 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 (Botanica Consulting, 2021a; Spectrum Ecology, 2019).

The vegetation associations within the application area are common and widespread within the region (Botanica Consulting, 2021a; Spectrum Ecology, 2019), and the vegetation proposed to be cleared is unlikely to be necessary for the continued existence of any species of Threatened flora.

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

**Methodology** Botanica Consulting (2021a)  
Spectrum Ecology (2019)

**(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).

A flora and vegetation survey of the application area did not identify any TECs (Botanica Consulting, 2021a; Spectrum Ecology, 2019).

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

**Methodology** Botanica Consulting (2021a)  
Spectrum Ecology (2019)

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 Coolgardie Bioregion of the Interim Biogeographic Regionalisation for Australia (IBRA) (GIS Database). Approximately 97.96% of the pre-European vegetation still exists in the Coolgardie Bioregion (Government of Western Australia, 2019). The application area is broadly mapped as Beard vegetation association 9 (GIS Database). Approximately 97.78% of the pre-European extent of this vegetation association remains uncleared at both the state and bioregional level (Government of Western Australia, 2019). The permit area does not contain any remnants nor does it form part of any remnants in the local area (GIS Database).

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

**Methodology** Government of Western Australia (2019)

GIS Database:

- IBRA Australia
- Imagery
- 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 not likely to be at variance to this Principle**

There are no permanent watercourses or wetlands within the area proposed to clear (GIS Database). There are three minor ephemeral drainage lines which intersect the permit area (GIS Database). These drainage lines all drain to a creek approximately 2.5 kilometres to the north of the permit area (GIS Database). None of the vegetation within the permit area was identified as being riparian vegetation (Botanica Consulting, 2021a; Spectrum Ecology, 2019). The proposed clearing is not likely to have a significant impact on watercourses or riparian vegetation in the local area.

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

**Methodology** Botanica Consulting (2021a)  
Spectrum Ecology (2019)

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 lies within the Coolgardie, Doney, Graves, Gumland and Lefroy land systems (DPIRD, 2021).

The vast majority of the permit area (~85%) is comprised of the Coolgardie, Doney and Graves land systems (DPIRD, 2021).

The Coolgardie Land System is described as uplands and undulating plains associated with ultramafic greenstones supporting eucalypt woodlands and halophytic shrublands (DPIRD, 2021). Where not protected by a stony mantle, footslopes and valley floors are susceptible to water erosion, particularly in areas where perennial shrub cover is substantially reduced and/or the soil surface is disturbed (DPIRD, 2021).

The Doney land system is described as calcareous sheetwash plains with eucalypt woodlands and a sclerophyllous shrub understorey (DPIRD, 2021). Apart from when perennial shrub cover is removed from drainage tracts, this land system is generally not susceptible to soil erosion (DPIRD, 2021). There are no drainage tracts present in areas of this land system within the permit area (GIS Database).

The stony mantles and moderately dense vegetation present in the Graves land system mean that this land system is generally not prone to erosion unless the protective stone mantle is removed (DPIRD, 2021). The alluvial plains of the valley floors are also susceptible to water erosion where perennial shrub cover is removed or the soil surface is disturbed (DPIRD, 2021).

The soil stability is variable across the permit area ranging from partially unstable and dispersive to partially stable and non-dispersive (Stantec, 2019).

Potential impacts from soil erosion may be minimised by the implementation of a staged clearing condition. The intent of the condition is to require any areas that are cleared are utilised within 3 months of the clearing, which will minimise the amount of areas cleared which do not have mining activities occurring.

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

**Methodology** DPIRD (2019)  
Stantec (2019)

GIS Database:  
- Hydrography, linear

**(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 managed land is the Kurrawang Nature Reserve which is located approximately 16 kilometres southeast 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 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. Surface water in the permit area is most likely to occur as sheet flow (Evolution Mining, 2021). The proposed clearing is unlikely to result in significant changes to surface water flows.

There are no Public Drinking Water Source Areas within or in close proximity to the application area (GIS Database). The groundwater at the nearby Mungari Gold Operations (11 kilometres southeast) is hypersaline with values ranging from 150,000-250,000 milligrams/Litre total dissolved solids (Evolution Mining, 2021). The proposed clearing is unlikely to cause deterioration in the quality of underground water.

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

**Methodology** Evolution Mining (2021)

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 climate of the region is semi-arid, with a low average rainfall of approximately 269.6 millimetres per year (BoM, 2021). Drainage lines in the area are dry for most of the year, only flowing briefly immediately following significant rainfall.

There are no permanent water courses or waterbodies within the application area (GIS Database). The permit area has a low risk of flooding as it is located near the top of a catchment divide (AQ2, 2019). 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** AQ2 (2019)  
BoM (Year)

GIS Database:

- Hydrography, linear

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

**Comments**

The clearing permit application was advertised on 5 April 2021 by the Department of Mines, Industry Regulation and Safety (DMIRS), inviting submissions from the public. There was one submission received stating no objection to this application.

There are three native title claims over the area under application (DPLH, 2021). 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, 2021). 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 (2021)

#### **4. References**

- AQ2 (2019) Rayjax and Castle Hill Mine Sites Surface Water Management Plan. Prepared for Evolution Mining Ltd, by AQ2 Pty Ltd, September 2019.
- BoM (2021) Bureau of Meteorology Website – Climate Data Online, Coolgardie. Bureau of Meteorology.  
<http://www.bom.gov.au/climate/data/> (Accessed 31 March 2021).
- Botanica Consulting (2021a) Rayjax Project Detailed Flora/Vegetation Survey and Basic Fauna Survey. Prepared for Evolution Mining Ltd, by Botanica Consulting Pty Ltd, January 2021.
- Botanica Consulting (2021b) Survey for the Arid Bronze Azure Butterfly and the Inland Hairstreak, Rayjax Project. Prepared for Evolution Mining Ltd, by Botanica Consulting Pty Ltd, June 2021.
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002. Department of Conservation and Land Management, Western Australia.
- DEC (2010) A Biodiversity and Cultural Conservation Strategy for the Great Western Woodlands. Department of Environment and Conservation, Western Australia.
- DPIRD (2021) Advice received in relation to Clearing Permit Application CPS 9242/1. Office of the Commissioner of Soil and Land Conservation, Department of Primary Industries and Regional Development, Western Australia, April 2021.
- DPLH (2021) Aboriginal Heritage Inquiry System. Department of Planning, Lands and Heritage.  
<https://espatial.dplh.wa.gov.au/AHIS/index.html?viewer=AHIS> (Accessed 30 April 2021).
- EPA (2016) Technical Guidance, Flora and Vegetation Surveys for Environmental Impact Assessment. Environmental Protection Authority, Western Australia, December 2016.

- Evolution Mining (Mungari) (2021) Application for Native Vegetation Clearing Permit for Rayjax Mine and Haul Road – M15/1827, M15/1831, L15/391. Evolution Mining (Mungari) Pty Ltd, 4 March 2021.
- Government of Western Australia (2019) 2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019. WA Department of Biodiversity, Conservation and Attractions, Perth. <https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics>
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Phoenix Environmental Services (2019) Flora and Vegetation Survey for Mungari Gold Operations Cutters Ridge Project. Prepared for Evolution Mining Ltd, By Phoenix Environmental Services, May 2019.
- Spectrum Ecology (2019) Rayjax and Castle Hill Reconnaissance Flora and Level 1 Fauna Survey. Prepared for Evolution Mining by Spectrum Ecology Pty Ltd, 19 September 2019.
- Stantec (2019) Rayjax Baseline Soil Resources Assessment. Prepared for Evolution Mining (Mungari) Pty Ltd, by Stantec, 13 December 2019.

## 5. Glossary

### Acronyms:

<b>BC Act</b>	<i>Biodiversity Conservation Act 2016</i> , Western Australia
<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</i> , Western Australia
<b>EPA</b>	Environmental Protection Authority, Western Australia
<b>EPBC Act</b>	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Federal Act)
<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</i> , Western Australia
<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).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

**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.