



## 1. Application details and outcomes

### 1.1. Permit application details

<b>Permit number:</b>	10464/1
<b>Permit type:</b>	Purpose Permit
<b>Applicant name:</b>	Musgrave Minerals Limited
<b>Application received:</b>	21 June 2023
<b>Application area:</b>	320 hectares
<b>Purpose of clearing:</b>	Mineral Production and Associated Activities
<b>Method of clearing:</b>	Mechanical Removal
<b>Tenure:</b>	Mining Leases 21/106, 21/107, 58/224, 58/366, 58/367 Miscellaneous Licence 58/42
<b>Location (LGA areas):</b>	Shire of Cue and Shire of Mount Magnet
<b>Colloquial name:</b>	Cue Gold Project

### 1.2. Description of clearing activities

Musgrave Minerals Limited proposes to clear up to 320 hectares of native vegetation within a boundary of approximately 548 hectares, for the purpose of mineral production and associated activities (Musgrave, 2023). The project is located approximately 30 kilometres south-west of Cue and 40 kilometres north of Mount Magnet, within the Shire of Cue and the Shire of Mount Magnet (GIS Database).

The application is to allow for the construction of a mine and associated infrastructure at the Cue Gold Project which consists of multiple open pits (five), waste rock landforms (four); Mine Ore Pads (MOPs) (three) and associated infrastructure (Musgrave, 2023; Ramelius Resources Limited, 2023).

### 1.3. Decision on application and key considerations

<b>Decision:</b>	Grant
<b>Decision date:</b>	29 February 2024
<b>Decision area:</b>	320 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 Energy, Mines, Industry Regulation and Safety (DEMIRS) on 21 June 2023. DEMIRS 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 D), supporting information provided by the applicant, including the results of a flora and vegetation survey, 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 into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values;
- impacts to conservation significant flora;
- impacts to conservation significant fauna;
- potential impacts to drainage lines; 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 could be minimised and managed to be environmentally acceptable.

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;
- staged clearing to minimise wind erosion;
- undertake slow, progressive one-directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity; and
- avoid clearing riparian vegetation and maintain surface water flow.

### 1.5. Site map

A site map of proposed clearing is provided in Figure 1 below.

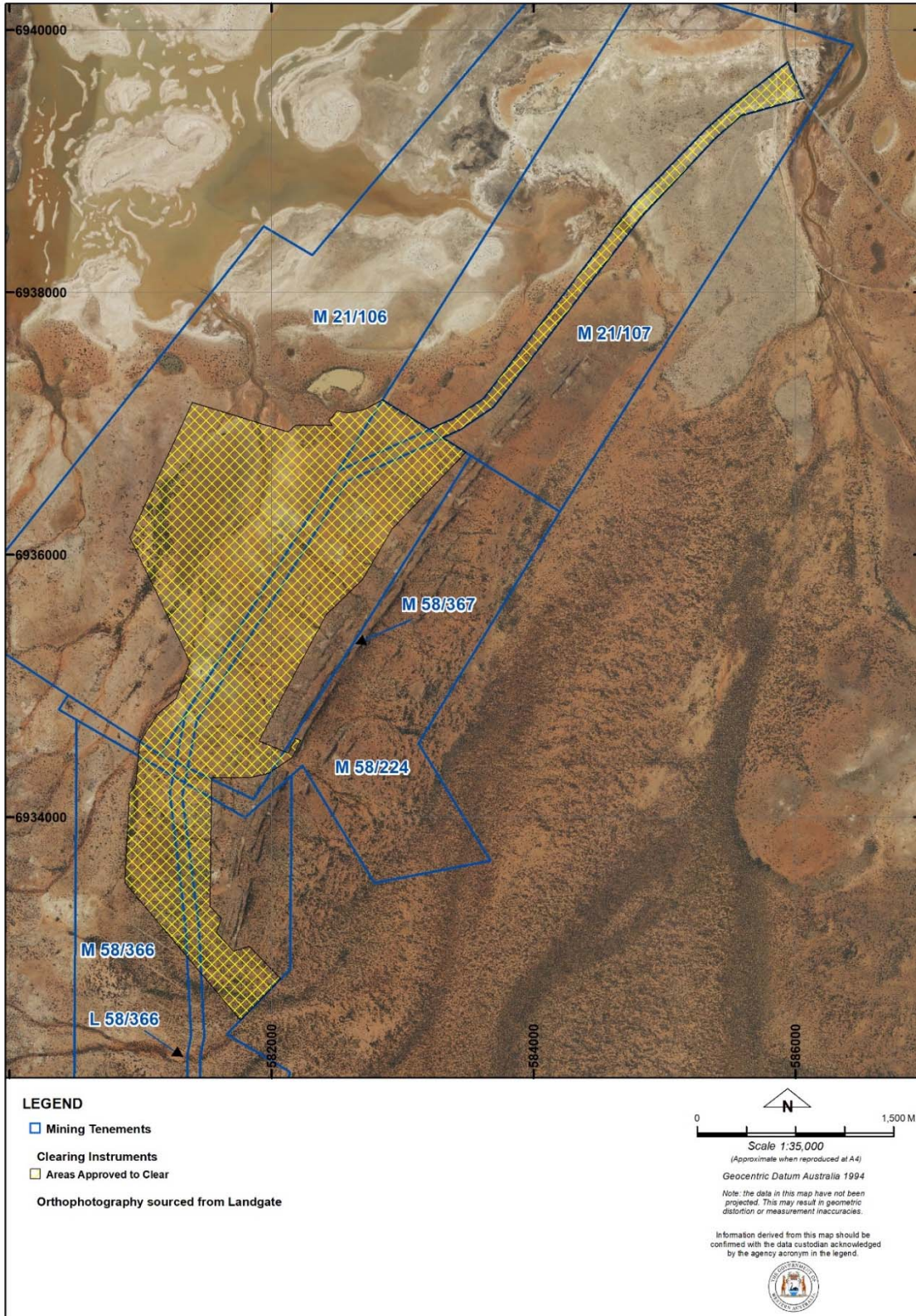


Figure 1. Map of the application area. The yellow area indicates the area within which conditional authorised clearing can occur under the granted clearing permit.

## 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)

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)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2020)

## 3. Detailed assessment of application

### 3.1. Avoidance and mitigation measures

Musgrave have outlined the following avoidance and mitigation measures:

- the permit area has been designed to avoid impacts to Lake Austin; and
- the permit area has been designed to minimise clearing within banded ironstone formation (BIF) rises habitats and vegetation associated with BIFs, breakaways and rocky areas;
- dust management will be implemented;
- vehicle traffic will be confined to defined roads and tracks and are speed limited;
- disturbed areas will be rehabilitated upon completion of mining activities or where progressively able to do so;
- internal Vehicle Hygiene and Weed Inspection Procedure will be maintained (Musgrave, 2023; Ramelius Resources Limited, 2023).

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 (flora, vegetation and fauna). 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 (flora) – Clearing Principle (a)

##### Assessment

360 Environmental (2021) undertook a single-phase flora and vegetation survey during August to September 2020, and Maia Environmental Consultancy (2023) undertook a targeted flora survey of the application area October 2022 (spring) and January 2023 (summer). The flora surveys identified 298 species of flora from 120 genera and 46 families (Maia Environmental Consultancy, 2023). No threatened flora species were recorded within the application area and surrounding survey area, however one Priority Flora species was recorded within the application area (Maia Environmental Consultancy, 2023).

*Hibiscus* sp. Perrinvale Station (J. Warden & E. Ager WB 10581), Priority 1, is a small, upright shrub growing to 1.5 metres high, this species has been recorded on Banded Ironstone Formation (BIF) hill slopes, rocky areas and within drainage lines (Maia Environmental Consultancy, 2023; Western Australian Herbarium, 1998-). These habitat types make up 5.6 percent of the application area (Banded Ironstone rises, breakaways and rocky areas: 0.4 hectares (0.1%); Mulga drainage: 30 hectares (5.5%)) (Terrestrial Ecosystems, 2023). This species has been recorded within the Gascoyne and Murchison Interim Biogeographic Regionalisation for Australia (IBRA) bioregions from 15 locations (Western Australian Herbarium, 1998-). The targeted flora survey identified four individuals within the application area and an additional 45 individuals (from 34 locations) within the surrounding area (Maia Environmental Consultancy, 2023). The proposed clearing will have an eight percent impact to the local population, resulting in a significant impact to this species at a local level but not at a regional level. The proponent has amended the clearing boundary to avoid the BIF located directly to the east of the application area which provides suitable habitat for this flora species.

Nine additional Priority flora species are considered to potentially occur within the application area (Maia Environmental Consultancy, 2023; GIS Database). These species were not recorded during the flora surveys and as suitable habitat is available within the surrounding areas, the clearing is not considered to have a significant impact to these species at a regional level.

An estimated 305 hectares of the application area is mapped within the Priority Ecological Community (PEC) 'Lake Austin vegetation complexes (banded ironstone formation)' (Priority 1), and 144 hectares are mapped within the Priority 3 Lake Austin Land System (Botanica Consulting; 2023; Maia Environmental Consultancy, 2023). The Lake Austin vegetation complexes (banded ironstone formation)' (Priority 1) PEC is mapped over approximately 35,510 hectares and the Lake Austin Land System Priority 3 PEC is mapped over approximately 22,443 hectares (Botanica Consulting, 2023). The proposed clearing of 320 hectares will result in the removal of 0.4 percent of the total mapped PEC 1 and 1.6 percent of the total mapped PEC 3 which is not considered a significant impact. The clearing permit area has been designed to avoid clearing impacts to Lake Austin and to minimise clearing within BIF habitats with vegetation associated with banded ironstone rises, breakaways and rocky areas, resulting in only 0.1% of the application area exhibiting this habitat.

#### Conclusion

For the reasons set out above, it is considered that the impacts of the proposed clearing on conservation significant flora can be managed by avoiding and minimising disturbance and by taking steps to minimise the risk of the introduction and spread of weeds.

#### Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- Avoid, minimise to reduce the impacts and extent of clearing; and
- Take hygiene steps to minimise the risk of the introduction and spread of weeds.

### 3.2.2. Biological values (fauna) - Clearing Principle (b)

#### Assessment

A detailed terrestrial vertebrate fauna survey was undertaken within the application area and the surrounding area from August to September 2020. The survey included trap sites installed within areas of suitable and representative habitat (360 Environmental, 2021). Motion sensitive cameras were also used in conjunction with systematic trapping sites and positioned in locations of particular interest and Autonomous Recording Units (ARUs) were used to target bat species and the Night Parrot (*Perzoporus occidentalis*) (360 Environmental, 2021). Sixty-three fauna species from 40 families were recorded within the survey area (360 Environmental, 2021). No conservation significant species or evidence of conservation significant species were recorded during this survey, however the habitat present within the application area provides habitat for several conservation significant fauna species (360 Environmental, 2021; Terrestrial Ecosystems, 2023).

Terrestrial Ecosystems (2023) undertook a basic vertebrate fauna survey assessment in December of 2022. The survey identified following eight fauna habitats within the application area:

- Banded Ironstone Formation (BIF) rises, breakaways and rocky areas: 0.4 hectares (0.1%);
- Chenopod shrubland: 20.6 hectares (3.8%);
- Disturbed: 28 hectares (5.1%);
- Halosarcia lake surrounds: eight hectares (1.5%);
- Mixed open shrubland: 323 hectares (58.9%);
- Mulga drainage: 30 hectares (5.5%);
- Mulga woodland: 125 hectares (22.8%); and
- Sand dune: 15 hectares (2.7%).

Although no individuals or evidence of conservation significant species were identified, 16 conservation significant fauna species have previously been recorded within 40 kilometres of the application area, and 12 of these species are considered to potentially occur within the application area based on suitable habitat and historical records (360 Environmental, 2021; Terrestrial Ecosystems, 2023; GIS Database). The clearing permit area has been designed to avoid clearing impacts to Lake Austin and to minimise clearing within BIF habitats with vegetation associated with banded ironstone rises, breakaways and rocky areas, which only represent 0.1% of the total permit area (Botanica Consulting, 2023).

The fauna habitat types represented in the permit area are abundant and in similar condition within the Murchison bioregion and in adjacent areas, and the permit area is unlikely to support a high level of fauna diversity due to a lack of understorey and leaf litter (Terrestrial Ecosystems, 2023). The fauna assemblage that is present in the project area is also present and abundant in the adjacent areas (Terrestrial Ecosystems, 2023). The proposed clearing is therefore not considered to likely impact on any conservation significant species.

#### Conclusion

For the reasons set out above, it is considered that the impacts of the proposed clearing on conservation significant fauna can be managed by undertaking slow progressive clearing in one direction to allow fauna to move into adjacent environments.

#### Conditions

To address the above impacts, the following management measure will be required as a condition on the clearing permit:

- Undertake slow progressive clearing to allow fauna to move into adjacent environments.

### 3.3. Relevant planning instruments and other matters

The clearing permit application was advertised on 4 January 2024 by the Department of Energy, Mines, Industry Regulation and Safety inviting submissions from the public. No submissions were received in relation to this application.

There is one native title claim over the area under application (Badimia People - WCD2015/001) (DPLH, 2024). This claim has been determined by the Federal Court on behalf of the claimant group. 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 three registered Aboriginal Sites of Significance within the application area (DPLH, 2024). 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.

**End**

## Appendix A. Site characteristics

### A.1. Site characteristics

Characteristic	Details																											
Local context	The application area is located approximately 30 kilometres south south-west of Cue and 40 kilometres north of Mount Magnet, within the Shire of Cue and the Shire of Mount Magnet (GIS Database). The area is located within the Murchison bioregion as described by the Interim Biogeographic Regionalisation of Australia (GIS Database). The area proposed to be cleared is part of an expansive tract of native vegetation in the extensive land use zone of Western Australia (GIS Database). The dominant land uses for the bioregion are native pasture to support grazing and crown land reserves, and to a lesser extent mining and exploration (Terrestrial Ecosystems, 2023). The region surrounding the application area has been disturbed for minerals exploration and there are many operational and non-operational mining projects in the region (Terrestrial Ecosystems, 2023).																											
Ecological linkage	The application area does not provide an important ecological linkage (Maia Environmental Consultancy, 2023; Terrestrial Ecosystems, 2023).																											
Conservation areas	The application area is not located within a conservation area (GIS Database). The nearest conservation area is the Lakeside National Park (DBCA Legislated Lands and Waters) located approximately five kilometres north west of the application area (GIS Database).																											
Vegetation description	<p>The vegetation of the application area is broadly mapped as the following Beard vegetation associations:</p> <ul style="list-style-type: none"> <li>• 240: Succulent steppe with open scrub; scattered <i>Acacia sclerosperma</i> and bowgada over saltbush &amp; bluebush; and</li> <li>• 313: Succulent steppe with open scrub; scattered <i>Acacia sclerosperma</i> and <i>A. victoriae</i> over bluebush (GIS Database).</li> </ul> <p>The following vegetation associations were recorded within the application area (Botanica Consulting, 2023; Maia Environmental Consultancy, 2023):</p> <table border="1"> <thead> <tr> <th>Vegetation Type</th> <th>Representative Priority Ecological Community</th> <th>Extent within application area</th> </tr> </thead> <tbody> <tr> <td>Disturbed.</td> <td>N/A</td> <td>65 ha (11.9%)</td> </tr> <tr> <td>Mixed Tall Acacia Shrubland mainly of <i>Acacia fuscaneura</i>, <i>A. grasbyi</i> and <i>A. tetragonophylla</i> with a Sparse Low Shrubland of <i>Maireana triptera</i>, <i>Solanum lasiophyllum</i> and <i>Sclerolaena densiflora</i> and Isolated Low Trees of <i>Acacia fuscaneura</i>.</td> <td>Austin Land System (P3) PEC</td> <td>101 ha (18.4%)</td> </tr> <tr> <td>Mixed Acacia Tall Shrubland mainly of <i>A. tetragonophylla</i>, <i>A. craspedocarpa</i> and <i>A. caesaneura</i> with a mixed Sparse Shrubland mainly of <i>Eremophila forrestii</i>, <i>Solanum lasiophyllum</i> and <i>Ptilotus obovatus</i>.</td> <td>Austin Land System (P3) PEC</td> <td>34 ha (6.2%)</td> </tr> <tr> <td>Mixed Acacia Tall Shrubland mainly of <i>Acacia tetragonophylla</i>, <i>A. craspedocarpa</i> and <i>A. caesaneura</i> with a mixed Sparse Shrubland of <i>Eremophila galeata</i> and / or <i>Teucrium teucriiflorum</i> and Isolated Low Shrubs of <i>Ptilotus obovatus</i>.</td> <td>Austin Land System (P3) PEC</td> <td>21.6 ha (3.9%)</td> </tr> <tr> <td>Mixed Acacia Tall Shrubland mainly of <i>Acacia aptaneura</i>, <i>A. ramulosa</i> var. <i>ramulosa</i> and <i>A. caesaneura</i> with a mixed Sparse Shrubland of <i>Eremophila forrestii</i> subsp. <i>forrestii</i>, <i>E. latrobei</i> subsp. <i>latrobei</i> and <i>E. georgei</i> and Isolated Low Shrubs of <i>Ptilotus obovatus</i>.</td> <td>Austin Land System (P3) PEC</td> <td>59 ha (10.8%)</td> </tr> <tr> <td>Mixed Acacia Tall Shrubland mainly of <i>Acacia aptaneura</i>, <i>A. caesaneura</i>, <i>A. grasbyi</i> with a mixed Shrubland mainly of <i>Philotheca brucei</i> subsp. <i>Brucei</i>, <i>Thryptomene decussata</i> and <i>Eremophila latrobei</i> subsp. <i>latrobei</i> with +/- Isolated Low trees of <i>Acacia pruinocarpa</i>.</td> <td>Lake Austin vegetation complexes (banded ironstone formation) P1 PEC</td> <td>0.4 ha (0.1%)</td> </tr> <tr> <td>Mixed Tall Shrubland mainly of <i>Acacia tetragonophylla</i>, <i>A. eremaea</i> and <i>A. caesaneura</i> with a mixed Shrubland mainly of <i>Eremophila forrestii</i> subsp. <i>forrestii</i>, <i>E. galeata</i> and <i>Senna</i> sp. Meekatharra and mixed Isolated Low Shrubs mainly of <i>Enchylaena tomentosa</i> subsp. <i>tomentosa</i>, <i>Rhagodia drummondii</i> and <i>Maireana trichoptera</i>.</td> <td>Austin Land System (P3) PEC</td> <td>41 ha (7.5%)</td> </tr> <tr> <td>Mixed Low Chenopod Shrubland mainly of <i>Maireana pyramidata</i>, <i>Sclerolaena cuneata</i> and <i>Atriplex codonocarpa</i> with a Sparse Tall Shrubland of <i>Hakea preissii</i>.</td> <td>Austin Land System (P3) PEC</td> <td>38 ha (6.9%)</td> </tr> </tbody> </table>	Vegetation Type	Representative Priority Ecological Community	Extent within application area	Disturbed.	N/A	65 ha (11.9%)	Mixed Tall Acacia Shrubland mainly of <i>Acacia fuscaneura</i> , <i>A. grasbyi</i> and <i>A. tetragonophylla</i> with a Sparse Low Shrubland of <i>Maireana triptera</i> , <i>Solanum lasiophyllum</i> and <i>Sclerolaena densiflora</i> and Isolated Low Trees of <i>Acacia fuscaneura</i> .	Austin Land System (P3) PEC	101 ha (18.4%)	Mixed Acacia Tall Shrubland mainly of <i>A. tetragonophylla</i> , <i>A. craspedocarpa</i> and <i>A. caesaneura</i> with a mixed Sparse Shrubland mainly of <i>Eremophila forrestii</i> , <i>Solanum lasiophyllum</i> and <i>Ptilotus obovatus</i> .	Austin Land System (P3) PEC	34 ha (6.2%)	Mixed Acacia Tall Shrubland mainly of <i>Acacia tetragonophylla</i> , <i>A. craspedocarpa</i> and <i>A. caesaneura</i> with a mixed Sparse Shrubland of <i>Eremophila galeata</i> and / or <i>Teucrium teucriiflorum</i> and Isolated Low Shrubs of <i>Ptilotus obovatus</i> .	Austin Land System (P3) PEC	21.6 ha (3.9%)	Mixed Acacia Tall Shrubland mainly of <i>Acacia aptaneura</i> , <i>A. ramulosa</i> var. <i>ramulosa</i> and <i>A. caesaneura</i> with a mixed Sparse Shrubland of <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. latrobei</i> subsp. <i>latrobei</i> and <i>E. georgei</i> and Isolated Low Shrubs of <i>Ptilotus obovatus</i> .	Austin Land System (P3) PEC	59 ha (10.8%)	Mixed Acacia Tall Shrubland mainly of <i>Acacia aptaneura</i> , <i>A. caesaneura</i> , <i>A. grasbyi</i> with a mixed Shrubland mainly of <i>Philotheca brucei</i> subsp. <i>Brucei</i> , <i>Thryptomene decussata</i> and <i>Eremophila latrobei</i> subsp. <i>latrobei</i> with +/- Isolated Low trees of <i>Acacia pruinocarpa</i> .	Lake Austin vegetation complexes (banded ironstone formation) P1 PEC	0.4 ha (0.1%)	Mixed Tall Shrubland mainly of <i>Acacia tetragonophylla</i> , <i>A. eremaea</i> and <i>A. caesaneura</i> with a mixed Shrubland mainly of <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. galeata</i> and <i>Senna</i> sp. Meekatharra and mixed Isolated Low Shrubs mainly of <i>Enchylaena tomentosa</i> subsp. <i>tomentosa</i> , <i>Rhagodia drummondii</i> and <i>Maireana trichoptera</i> .	Austin Land System (P3) PEC	41 ha (7.5%)	Mixed Low Chenopod Shrubland mainly of <i>Maireana pyramidata</i> , <i>Sclerolaena cuneata</i> and <i>Atriplex codonocarpa</i> with a Sparse Tall Shrubland of <i>Hakea preissii</i> .	Austin Land System (P3) PEC	38 ha (6.9%)
Vegetation Type	Representative Priority Ecological Community	Extent within application area																										
Disturbed.	N/A	65 ha (11.9%)																										
Mixed Tall Acacia Shrubland mainly of <i>Acacia fuscaneura</i> , <i>A. grasbyi</i> and <i>A. tetragonophylla</i> with a Sparse Low Shrubland of <i>Maireana triptera</i> , <i>Solanum lasiophyllum</i> and <i>Sclerolaena densiflora</i> and Isolated Low Trees of <i>Acacia fuscaneura</i> .	Austin Land System (P3) PEC	101 ha (18.4%)																										
Mixed Acacia Tall Shrubland mainly of <i>A. tetragonophylla</i> , <i>A. craspedocarpa</i> and <i>A. caesaneura</i> with a mixed Sparse Shrubland mainly of <i>Eremophila forrestii</i> , <i>Solanum lasiophyllum</i> and <i>Ptilotus obovatus</i> .	Austin Land System (P3) PEC	34 ha (6.2%)																										
Mixed Acacia Tall Shrubland mainly of <i>Acacia tetragonophylla</i> , <i>A. craspedocarpa</i> and <i>A. caesaneura</i> with a mixed Sparse Shrubland of <i>Eremophila galeata</i> and / or <i>Teucrium teucriiflorum</i> and Isolated Low Shrubs of <i>Ptilotus obovatus</i> .	Austin Land System (P3) PEC	21.6 ha (3.9%)																										
Mixed Acacia Tall Shrubland mainly of <i>Acacia aptaneura</i> , <i>A. ramulosa</i> var. <i>ramulosa</i> and <i>A. caesaneura</i> with a mixed Sparse Shrubland of <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. latrobei</i> subsp. <i>latrobei</i> and <i>E. georgei</i> and Isolated Low Shrubs of <i>Ptilotus obovatus</i> .	Austin Land System (P3) PEC	59 ha (10.8%)																										
Mixed Acacia Tall Shrubland mainly of <i>Acacia aptaneura</i> , <i>A. caesaneura</i> , <i>A. grasbyi</i> with a mixed Shrubland mainly of <i>Philotheca brucei</i> subsp. <i>Brucei</i> , <i>Thryptomene decussata</i> and <i>Eremophila latrobei</i> subsp. <i>latrobei</i> with +/- Isolated Low trees of <i>Acacia pruinocarpa</i> .	Lake Austin vegetation complexes (banded ironstone formation) P1 PEC	0.4 ha (0.1%)																										
Mixed Tall Shrubland mainly of <i>Acacia tetragonophylla</i> , <i>A. eremaea</i> and <i>A. caesaneura</i> with a mixed Shrubland mainly of <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. galeata</i> and <i>Senna</i> sp. Meekatharra and mixed Isolated Low Shrubs mainly of <i>Enchylaena tomentosa</i> subsp. <i>tomentosa</i> , <i>Rhagodia drummondii</i> and <i>Maireana trichoptera</i> .	Austin Land System (P3) PEC	41 ha (7.5%)																										
Mixed Low Chenopod Shrubland mainly of <i>Maireana pyramidata</i> , <i>Sclerolaena cuneata</i> and <i>Atriplex codonocarpa</i> with a Sparse Tall Shrubland of <i>Hakea preissii</i> .	Austin Land System (P3) PEC	38 ha (6.9%)																										

Characteristic	Details		
	Open Low mixed Shrubland mainly of <i>Maireana pyramidata</i> , <i>M. triptera</i> and <i>Ptilotus obovatus</i> with a Sparse mixed Shrubland mainly of <i>Eremophila galeata</i> , <i>Rhagodia drummondii</i> and <i>Senna</i> sp. Meekatharra (E. Bailey 1-26) and isolated Tall Shrubs of <i>Hakea preissii</i> , <i>Acacia tetragonophylla</i> and <i>A. aptaneura</i> .	Lake Austin vegetation complexes (banded ironstone formation) P1 PEC	130 ha (23.7%)
	Mixed Low Shrubland mainly of <i>Maireana pyramidata</i> , <i>Ptilotus obovatus</i> and <i>Alyogyne pinoniana</i> var. <i>pinoniana</i> with a mixed Tall Sparse Shrubland of mainly <i>Acacia grasbyi</i> , <i>A. incurvaneura</i> and <i>A. caesaneura</i> with a Sparse Tussock Grassland of <i>Eragrostis eriopoda</i> , <i>Monachather paradoxus</i> and <i>Eriachne helmsii</i> .	Austin Land System (P3) PEC	11 ha (2.0%)
	Mixed Low Samphire Shrubland mainly of <i>Tecticornia pruinosa</i> , <i>T. peltata</i> and <i>T. fimbriata</i> .	Austin Land System (P3) PEC	6 ha (1.1%)
	Mixed Shrubland mainly of <i>Cratystylis subspinescens</i> , <i>Lycium australe</i> and <i>Rhagodia drummondii</i> with a mixed Low Chenopod Shrubland mainly of <i>Maireana trichoptera</i> , <i>M. carnosae</i> and <i>Sclerolaena cuneata</i> with Isolated Tall Shrubs to a Sparse Tall Shrubland of <i>Acacia victoriae</i> and <i>Eremophila longifolia</i> .	N/A	1 ha (0.2%)
	Mixed Sparse Shrubland mainly of <i>Eremophila longifolia</i> , <i>Hakea preissii</i> and <i>Acacia victoriae</i> with a mixed Sparse Low Shrubland mainly of <i>Frankenia laxiflora</i> , <i>Maireana pyramidata</i> and <i>Solanum lasiophyllum</i> .	Austin Land System (P3) PEC	24 ha (4.4%)
	Mixed Tall Open Shrubland mainly of <i>Acacia victoriae</i> subsp. <i>victoriae</i> , <i>Eremophila longifolia</i> , <i>A. craspedocarpa</i> with a mixed Low Open Shrubland mainly of <i>Maireana trichoptera</i> , <i>Solanum lasiophyllum</i> , <i>Salsola australis</i> and an Open Tussock Grassland of <i>Enneapogon caerulescens</i> and / or <i>Eragrostis falcata</i> .	Austin Land System (P3) PEC	16 ha (2.9%)
Vegetation condition	<p>The vegetation survey (Maia Environmental Consultancy, 2023) indicated the vegetation within the proposed clearing area is in Degraded to Excellent (Trudgen, 1991) condition, described as</p> <ul style="list-style-type: none"> <li>• Excellent: Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement;</li> <li>• Very Good: Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks;</li> <li>• Good: More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds</li> <li>• Degraded: Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.</li> </ul> <p>The full Trudgen (1991) condition rating scale is provided in Appendix C.</p>		
Climate and landform	The application area experiences a semi-arid climate with an annual rainfall of 240 millimetres (BoM, 2024).		
Soil description and Land degradation risk	<p>The soils of the application area are broadly mapped as the following soil types:</p> <ul style="list-style-type: none"> <li>• Austin System: mainly erosional surfaces dominated by gently sloping plains with moderately dense to very dense mantles of quartz or ironstone gravels and pebbles. Soils are predominately shallow hard setting duplex types such as sandy loams over light clays. The vegetation is a mixture of scattered trees and low shrublands;</li> <li>• Carnegie System: salt lakes and fringing level to gently sloping plains with saline alluvium and low sand dunes above surrounding saline plains. The lack of slope renders most of the system generally not susceptible to soil erosion except at lake margins where wind erosion may be exacerbated by loss of stabilising vegetation;</li> <li>• Gabanintha System: erosional surfaces with long ranges of low hills and ridges, rough rounded crests and concave footslopes. The vegetation varies from a mixed hill shrubland to a stoney mulga shrubland with a halophytic shrubland on the accessible footslopes;</li> <li>• Mileura System: saline and non-saline calcrete river plains with clayey flood plains interrupted by raised calcrete platforms. Depositional surfaces, calcrete valley fills with a</li> </ul>		

Characteristic	Details
	<p>mosaic of dissected calcrete platform usually 1 to 10 km wide and 2 to 5 metres high; and</p> <ul style="list-style-type: none"> <li>Violet System: undulating stony and gravelly plains with low rises supporting mulga shrublands. Extensive, gently undulating to level plains and low rises with mantles of ironstone pebbles and level to very gently inclined plains subject to sheet flow with mantles of fine ironstone gravel. Soils vary from dark red gravels, clayey sands or fine sandy loams to shallow red earths, clay loams or fine sandy loams. Abundant mantles provide effective protection against soil erosion over most of this land system, except where the soil surface has been disturbed. In such circumstances, the soil becomes moderately susceptible to water erosion. The narrow drainage tracts are mildly susceptible to water erosion (DPIRD, 2024a; 2024b).</li> </ul>
Waterbodies	The desktop assessment and aerial imagery indicated that there are two minor non-perennial water courses that intersect the application area (GIS Database). Lake Austin is located directly north of the application area (GIS Database).
Hydrogeography	The application area is not mapped within a proclaimed public drinking water area (GIS Database). The area is mapped within the East Murchison Groundwater Area, proclaimed under the Rights in Water Irrigation (RIWI) Act (GIS Database).
Flora	There are records of 10 priority flora species within a 20 kilometres radius of the application area (GIS Database). The Flora and Vegetation survey undertaken by Maia Environmental Consultancy (2023) identified one Priority flora species within the application area.
Ecological communities	There are no Threatened Ecological Communities (TECs) within the application area (Maia Environmental Consultancy, 2023; GIS Database). The application area is partially mapped within the Austin Land System (P3) Priority Ecological Community (PEC) and the Lake Austin BIF (Banded Ironstone Formation) P1 PEC (Maia Environmental Consultancy, 2023; GIS Database).
Fauna	There are records of 16 priority fauna species within a 40 kilometres radius of the application area (GIS Database). There are no records of conservation significant fauna species within the application area (GIS Database)
Fauna habitat	<p>Terrestrial Ecosystems (2023) undertook a basic vertebrate fauna survey assessment in December of 2022. The survey identified following eight fauna habitats within the application area:</p> <ul style="list-style-type: none"> <li>Banded Ironstone rises, breakaways and rocky areas: 0.4 hectares (0.1%);</li> <li>Chenopod shrubland: 20.6 hectares (3.8%);</li> <li>Disturbed: 28 hectares (5.1%);</li> <li>Halosarcia lake surrounds: 8 hectares (1.5%);</li> <li>Mixed open shrubland: 323 hectares (58.9%);</li> <li>Mulga drainage: 30 hectares (5.5%);</li> <li>Mulga woodland: 125 hectares (22.8%); and</li> <li>Sand dune: 15 hectares (2.7%) (Botanica Consulting, 2023; Terrestrial Ecosystems, 2023).</li> </ul>

## 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 Murchison	28,120,586.77	28,044,823.42	99.73	2,185,987.96	7.77
Beard vegetation associations - State					
Veg Assoc No. 240	119,107.79	119,107.79	100.00	43,393.15	36.43
Veg Assoc No. 313	68,843.52	65,261.44	94.80	1.79	0.00
Beard vegetation associations - Bioregion					
Veg Assoc No. 240	106,950.03	106,950.03	100.00	42,572.23	39.81
Veg Assoc No. 313	68,843.52	65,261.44	94.80	1.79	0.00

Government of Western Australia (2019)



### A.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix D.1), and biological survey information (Maia Environmental Consultancy, 2023; Terrestrial Ecosystems, 2023; Western Australian Herbarium, 1998-) impacts to the following conservation significant flora and fauna required further consideration.

Species name	Conservation status	Suitable habitat features? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)
<i>Acacia speckii</i>	P4	Y	~16	40
<i>Angianthus microcephalus</i>	P2	Y	~8	17
<i>Angianthus uniflorus</i>	P1	Y	~3	2
<i>Calotis</i> sp. Perrinvale Station	P3	Y	~0.5	24
<i>Drosera eremaea</i>	P3	Y	~8	148
<i>Euryomyrtus recurva</i>	P3	Y	~13	30
<i>Grevillea inconspicua</i>	P4	Y	~1	61
<i>Hibiscus</i> sp. Perrinvale Station (J. Warden & E. Ager WB 10581)	P1	Y	0	15
<i>Minuria tridens</i>	P1	Y	~5	9
<i>Tecticornia fimbriata</i>	P3	Y	~11	31

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

### A.4. Fauna analysis table

Species name	Common Name	Conservation status	Distance of closest record to application area (km)	Suitable habitat features? [Y/N]
<i>Amytornis textilis textilis</i>	western grasswren, thick-billed grasswren (western)	P4	~19	Y
<i>Calidris acuminata</i>	sharp-tailed sandpiper	MI	~6	Y
<i>Calidris ferruginea</i>	curlew sandpiper	CR	~10	Y
<i>Chlidonias leucopterus</i>	white-winged black tern	MI	~16	Y
<i>Cyclodomorphus branchialis</i>	gilled slender blue-tongue	VU	~37	Y
<i>Falco peregrinus</i>	peregrine falcon	OS	~25	N
<i>Gelochelidon nilotica</i>	gull-billed tern	MI	~6	Y
<i>Idiosoma clypeatum</i>	northern shield-backed trapdoor spider	P3	~39	Y
<i>Leipoa ocellata</i>	malleefowl	VU	~23	N
<i>Lerista eupoda</i>	West Coast mulga slider	P1	~39	Y
<i>Limosa lapponica</i>	bar-tailed godwit	MI	~34	Y
<i>Macrotis lagotis</i>	bilby, dalgyte, ninu	VU	~26	Y
<i>Petrogale lateralis lateralis</i>	black-flanked rock-wallaby, black-footed rock-wallaby, moorong	EN	~40	N
<i>Pezoporus occidentalis</i>	night parrot	CR	~33	N
<i>Thinornis rubricollis</i>	hooded plover, hooded dotterel	P4	~6	Y
<i>Tringa glareola</i>	wood sandpiper	MI	~10	Y

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority, OS: other specially protected

**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><u>Principle (a):</u> <i>“Native vegetation should not be cleared if it comprises a high level of biodiversity.”</i></p> <p><u>Assessment:</u></p> <p>Flora and fauna surveys identified 298 species of flora from 120 genera and 46 families (Maia Environmental Consultancy, 2023). No threatened flora or fauna species were recorded, however one Priority Flora species was recorded within the application area (Maia Environmental Consultancy, 2023). The application area consists of 13 vegetation associations and five Land Systems (DPIRD 2020a). A portion of the application area is mapped as the Austin Land System (P3) Priority Ecological Community (PEC) and the Lake Austin BIF (Banded Ironstone Formation) P1 PEC (Maia Environmental Consultancy, 2023; GIS Database).</p>	At variance	Yes  <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (b):</u> <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 area proposed to be cleared may contain foraging habitat for several conservation significant fauna species (Terrestrial Ecosystems, 2023; GIS Database).</p>	May be at variance	Yes  <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (c):</u> <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 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 (Maia Environmental Consultancy, 2023).</p>	Not likely to be at variance	No
<p><u>Principle (d):</u> <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>There are no known Threatened Ecological Communities (TECs) located within the application area and the flora and vegetation survey did not identify any TECs (Maia Environmental Consultancy, 2023; GIS Database).</p>	Not likely to be at variance	No
<b>Environmental value: significant remnant vegetation and conservation areas</b>		
<p><u>Principle (e):</u> <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 extent of the native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia (Commonwealth of Australia, 2001). The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area (GIS Database).</p>	Not at variance	No
<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>Given the distance to the nearest conservation area, the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas (GIS Database).</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>Given multiple non-perennial water courses transect the application area, the proposed clearing is likely to impact on- or off-site hydrology and water quality. Impact</p>	May be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
to these water courses may be managed by implementing a watercourse management condition.		
<p><u>Principle (g):</u> “Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</p> <p><u>Assessment:</u></p> <p>The application area is mapped within the Austin, Carnegie, Gabanintha, Mileura and Violet Land Systems, which may experience erosional surfaces (DPIRD 2024a; 2024b). Land degradation may be managed by implementing a staged clearing condition.</p>	May be at variance	No
<p><u>Principle (i):</u> “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.”</p> <p><u>Assessment:</u></p> <p>Given multiple non-perennial water courses transect the application area, the proposed clearing is likely to impact surface or ground water quality (GIS Database). Impact to these water courses may be managed by implementing a watercourse management condition.</p>	May be at variance	No
<p><u>Principle (j):</u> “Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</p> <p><u>Assessment:</u></p> <p>The mapped soils and topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased 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 Trudgen, M.E. (1991) *Vegetation condition scale* in National Trust (WA) 1993 Urban Bushland Policy. National Trust of Australia (WA), Wildflower Society of WA (Inc.), and the Tree Society (Inc.), Perth.

#### Measuring vegetation condition for the Eremaean and Northern Botanical Provinces (Trudgen, 1991)

Condition	Description
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Very poor	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or ‘parkland cleared’ with their flora comprising weed or crop species with isolated native trees or shrubs.

## Appendix D. Sources of information

### D.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)
- Contours (DPIRD-073)
- 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)
- Flood Risk (DPIRD-007)
- 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
- Interim Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- 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:

- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

### D.2. References

- 360 Environmental (2021) Moyagee Gold Project Biological Survey. Report prepared for Musgrave Minerals, February 2021.
- Botanica Consulting (2023) Environmental Assessment. Cue Gold Project Clearing Permit Application M21/106, M21/107, M58/224, M58/366, M58/367 & L58/42. Report prepared for Ramelius Resources Limited, December 2023.
- Bureau of Meteorology (BoM) (2024) Bureau of Meteorology Website – Climate Data Online, Mount Magnet Aero (007600). Bureau of Meteorology. <https://reg.bom.gov.au/climate/data/> (Accessed 22 January 2024).
- Commonwealth of Australia (2001) *National Objectives and Targets for Biodiversity Conservation 2001-2005*, Canberra.
- Department of Environment Regulation (DER) (2014) *A guide to the assessment of applications to clear native vegetation*. Perth. Available from: [https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Guidelines/Guide2\\_assessment\\_native\\_veg.pdf](https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Guidelines/Guide2_assessment_native_veg.pdf)
- Department of Planning, Lands and Heritage (DPLH) (2024) Aboriginal Heritage Inquiry System. Department of Planning, Lands and Heritage. <https://espatial.dplh.wa.gov.au/AHIS/index.html?viewer=AHIS> (Accessed 16 February 2024).
- Department of Primary Industries and Regional Development (DPIRDa) (2024) Advice received in relation to Clearing Permit Application CPS 10464.1. Office of the Commissioner of Soil and Land Conservation, Department of Primary Industries and Regional Development, Western Australia, January 2024.
- Department of Primary Industries and Regional Development (DPIRDb) (2024) NRInfo Digital Mapping. Department of Primary Industries and Regional Development. Government of Western Australia. URL: <https://dpiird.maps.arcgis.com/apps/webappviewer/index.html?id=662e8cbf2def492381fc915aaf3c6a0f> (Accessed 16 February 2024).
- Department of Water and Environmental Regulation (DWER) (2021) Procedure: Native vegetation clearing permits. Joondalup. Available from: [https://dwer.wa.gov.au/sites/default/files/Procedure\\_Native\\_vegetation\\_clearing\\_permits\\_v1.pdf](https://dwer.wa.gov.au/sites/default/files/Procedure_Native_vegetation_clearing_permits_v1.pdf)
- Environmental Protection Authority (EPA) (2016) Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment. Available from: [http://www.epa.wa.gov.au/sites/default/files/Policies\\_and\\_Guidance/EPA%20Technical%20Guidance%20-%20Flora%20and%20Vegetation%20survey\\_Dec13.pdf](http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/EPA%20Technical%20Guidance%20-%20Flora%20and%20Vegetation%20survey_Dec13.pdf)
- Environmental Protection Authority (EPA) (2020) Technical Guidance – Terrestrial Fauna Surveys. Available from: [https://www.epa.wa.gov.au/sites/default/files/Policies\\_and\\_Guidance/2020.09.17%20-%20EPA%20Technical%20Guidance%20-%20Vertebrate%20Fauna%20Surveys%20-%20Final.pdf](https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/2020.09.17%20-%20EPA%20Technical%20Guidance%20-%20Vertebrate%20Fauna%20Surveys%20-%20Final.pdf)
- 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. <https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics>

Maia Environmental Consultancy (2023) Musgrave Minerals Limited (Musgrave): Cue Gold Project. Single-Phase Detailed Flora and Vegetation Assessment and Targeted Flora Survey (Spring / Summer / 2022 / 2023). Report prepared for Musgrave Minerals Limited, September 2023.

Musgrave (2023) Clearing permit application form, CPS 10464/1, received 21 June 2023.

Ramelius Resources Limited (2023) Mining Proposal. Cue Gold Project. Report prepared for Musgrave Minerals Ltd, December 2023.

Terrestrial Ecosystems (2023) Basic Vertebrate Fauna Survey and Assessment. Report prepared for Musgrave Minerals Ltd, May 2023.

Trudgen, M.E. (1991) Vegetation condition scale in National Trust (WA) 1993 Urban Bushland Policy. National Trust of Australia (WA), Wildflower Society of WA (Inc.), and the Tree Society (Inc.), Perth.

Western Australian Herbarium (1998-) FloraBase - the Western Australian Flora. Department of Biodiversity, Conservation and Attractions, Western Australia. <https://florabase.dpaw.wa.gov.au/> (Accessed 22 February 2024).

## 4. 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>DCCEEW</b>	Department of Climate Change, Energy, the Environment and Water, Australian Government
<b>DBCA</b>	Department of Biodiversity, Conservation and Attractions, Western Australia
<b>DEMIRS</b>	Department of Energy, Mines, Industry Regulation and Safety
<b>DER</b>	Department of Environment Regulation, Western Australia (now DWER)
<b>DMIRS</b>	Department of Mines, Industry Regulation and Safety, Western Australia (now DEMIRS)
<b>DMP</b>	Department of Mines and Petroleum, Western Australia (now DEMIRS)
<b>DoEE</b>	Department of the Environment and Energy (now DCCEEW)
<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.

**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.