Department of Energy, Mines, Industry Regulation and Safety
GOVERNMENT OF WESTERN AUSTRALIA

# Clearing Permit Decision Report

## 1. Application details and outcomes

### 1.1. Permit application details

| | |
|---|---|
| **Permit number:** | 3399/4 |
| **Permit type:** | Area Permit |
| **Applicant name:** | Karara Mining Limited |
| **Application received:** | 30 October 2024 |
| **Application area:** | 67 Hectares |
| **Purpose of clearing:** | Mineral Production |
| **Method of clearing:** | Mechanical Removal |
| **Tenure:** | General Purpose Lease 59/38 |
| **Location (LGA area/s):** | Shire of Perenjori |
| **Colloquial name:** | Karara to Tilley Rail Project |

### 1.2. Description of clearing activities

Karara Mining Limited proposes to clear up to 67 hectares of native vegetation within a boundary of approximately 67 hectares, for the purpose of constructing a rail loop. The project is located approximately 50 kilometres north-east of Perenjori (GIS Database), within the Shire of Perenjori

Clearing permit CPS 3399/1 was granted by the Department of Mines and Petroleum (now the Department of Energy, Mines, Industry Regulation and Safety) on 14 January 2010 and was valid from 13 February 2010 to 13 February 2015. The permit authorised the clearing of up to 67 hectares of native vegetation within a boundary of 67 hectares, for the purpose of purpose of constructing a rail loop.

CPS 3399/2 was granted on 12 February 2015 extend the permit duration to 13 February 2020. The area of clearing authorised remained unchanged. CPS 3399/3 was granted on 13 February 2020 extend the permit duration to 13 February 2025. On the 30 October 2024 the proponent applied to amend the permit to further extend the permit duration by three years. At the time of this application the proponent had cleared 44.828 hectares of the 67 hectares approved.

### 1.3. Decision on application and key considerations

| | |
|---|---|
| **Decision:** | Grant |
| **Decision date:** | 11 February 2025 |
| **Decision area:** | 67 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 30 October 2024. DEMIRS advertised the application for a public comment for a period of 7 days, and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (Appendix A), relevant datasets (Appendix E), supporting information provided by the applicant including the results of a flora and vegetation survey (Appendix D), the clearing principles set out in Schedule 5 of the EP Act (Appendix C), proposed avoidance and minimisation measures (Section 3.3), 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;
- the loss of native vegetation that is suitable habitat for malleefowl (*Leipoa ocellata*).
- the loss of native vegetation that is suitable habitat for Western spiny-tailed skink (*Egernia stokesii badia*)

The assessment has not changed since the assessment for CPS 3399/3. The Delegated Officer determined that the proposed extension of the permit is not likely to lead to an unacceptable risk to environmental values.

### 1.5. Site map

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

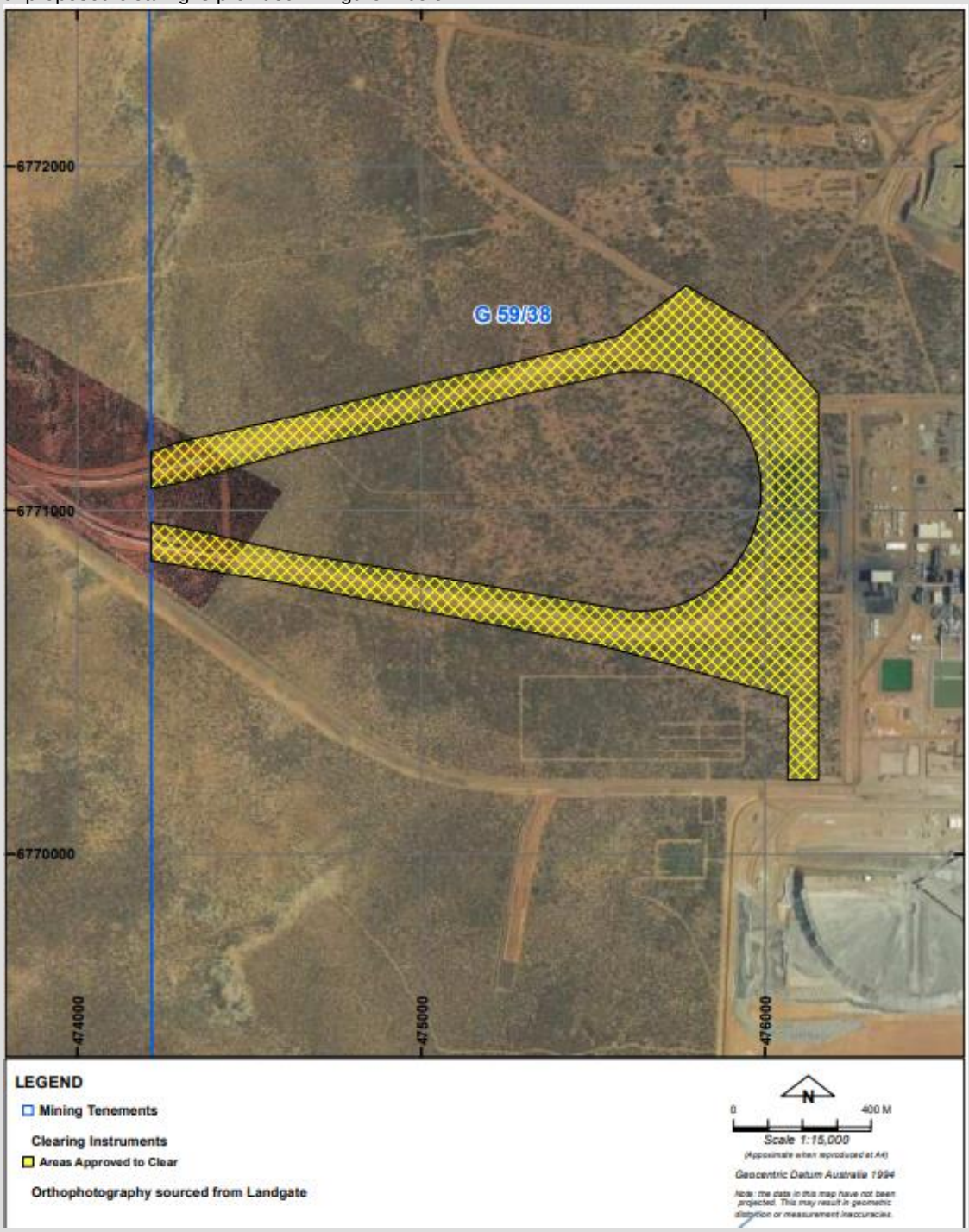



**Figure 1. Map of the application area. The yellow area indicates the area within which conditional authorised clearing can occur under the granted clearing permit.**

## 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)
- *Mining Act 1978* (WA)

- *The Petroleum and Geothermal Energy Resources Act 1967* (WA)

Relevant policies considered during the assessment include:
- *Environmental Offsets Policy* (2011)

The key guidance documents which inform this assessment are:
- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- Environmental Offsets Guidelines (August 2014) (Delete if offsets not considered)

## 3. Detailed assessment of application

### 3.1. Avoidance and mitigation measures

As the application area transects habitat suitable for the vulnerable listed species malleefowl (*Leipoa ocellata*), and western spiny-tailed skink (*Egernia stokesii badia*), as a migration measure Karara Mining Limited (2009a 2009b) has drafted and implemented management and monitoring plans, as summarised in the table below.

| **malleefowl** | **western spiny-tailed skink** |
|---|---|
| Training and awareness. | Training and awareness. |
| Malleefowl mound surveys. | Habitat surveys. |
| The creation of malleefowl corridors. | Identification and monitoring of habitat outside the disturbance footprint. |
| Ferral animal control. | Avoidance where possible |
| Malleefowl mound monitoring. | Signage and flagging of habitat |
| - | Translocation |

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

A review of current environmental information (Appendix C) reveals that the assessment against the clearing principles has not changed significantly from the Clearing Permit Decision Report CPS 3399/3.

#### *3.2.1. Biological values, Conservation significant Flora, Priority Ecological Community conservation significant fauna - Clearing Principles* (a) and (b).

Assessment

Flora:

Since the original application CPS 3399/1, the application area has been subject to an additional floristic survey in 2020 (Woodman, 2021). As a result vegetation units described in CPS 3399/1 have been revised, however there has not been any change in the recorded floristic diversity, with the application area comprising five vegetation communities, classified as excellent (Keighery, 1994) condition.

The Priority 3 flora species *Persoonia pentasticha* is a low spreading shrub endemic to the southern Midwest region. *Persoonia pentasticha* was recorded within and directly adjacent to the application area (Woodman, 2021). It is estimated that *Persoonia pentasticha* occurs in 44 discrete populations across the local area (Woodman, 2020; GIS database) comprising 996 records. As the *Persoonia pentasticha* specimen collected within the application area represents a single individual (Woodman, 2021), it is unlikely the proposed clearing will have a significant impact on the local or regional population of this species.

A portion of the application area (0.36 hectares) is mapped as the Priority 3 Ecological Community (PEC) Blue Hills (Mt Karara/Mungada Ridge/Blue Hills) vegetation complexes (banded ironstone formation), (GIS Database). The survey carried out by Woodman Environmental Consulting in 2020 identified 10 vegetation types (refer to Appendix D), analogous to the above PEC (Woodman 2020), however none of the vegetation 10 vegetation types were identified in the application area therefore, the above PEC is not likely to be impacted.

Fauna:

The Shield-backed Trapdoor Spider (*Idiosoma nigrum*) is listed as endangered under the *Biodiversity Conservation Act 2016* and vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*. Survey work carried in support of CPS 3399/1 (Bamford Consulting Ecologists 2007) recorded Shield-backed Trapdoor Spider as occurring less then one kilometre from the application area. However, since this survey this species has undergone major taxonomic review and has been split into multiple new species. As a result, previous records of Shield-backed Trapdoor are now considered to be the species *Idiosoma clypeatum* listed as Priority 3 (Rix *et al*. 2018 and GIS Database). Since 2007 a number of targeted studies have been carried in an effort to monitor and map the identification and distribution of Shield-backed Trapdoor Spiders within Karara Mining's tenements including the application area. These surveys include, Bamford, M. J. and Metcalf, B. M. (2008), Huang, N. and Bamford, M. J. (2011a), and Huang, N, Bamford, M. J. (2011b) and Bancroft, W. J., Huang, N. and Bamford, M. J. (2012). During this period of monitoring and survey no Shield-backed Trapdoor Spiders have been recorded in the application area.

All other desktop information has been revised been reviewed, and the assessment of the proposed clearing against the clearing principles remains consistent with the assessments for CPS 3399/1, 3399/2 and 3399/3.

Conclusion

The proposed clearing will impact the Priority 3 shrub *Persoonia pentasticha,* however the impact is not considered to significant to the sustainability of the species across its range. An additional floristic survey has confirmed the Priority 3 Blue Hills (Mt Karara/Mungada Ridge/Blue Hills) vegetation complexes (banded ironstone formation), will not be impacted by the proposed clearing. As a result of changes in taxonomy of Shield-backed Trapdoor Spider recorded as *Idiosoma nigrum* is no longer considered to present with the local area, including the application area.

Conditions

Given there is no change in the impacts to the environmental values identified in the desktop review, conditions additional to those set out under CPS 3399/3 are not required.

### 3.3. Relevant planning instruments and other matters

The clearing permit amendment application was advertised on 14 January 2025 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 are no native title claims over the area under application (DPLH, 2025). 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 two registered Aboriginal Sites of Significance within the application area (DPLH, 2020). 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 project area is located approximately 50 kilometres north-east of Perenjori (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 predominant land use in the region is pastureland, conservation, and mining activities. |
| Ecological linkage | The local area does not contain any ecological linkages. Vegetation within the local area is relatively uncleared and therefore the dispersal of flora and movement of fauna are not restricted. |
| Conservation areas | The proposed clearing occurs within a former pastoral lease now mapped as DBCA-Lands of interest (GIS Database). The nearest conservation area is Mungada Ridge, 14 kilometres northeast of the application area. |
| Vegetation description | The vegetation of the application area is broadly mapped as the following Beard vegetation associations:<br>• 358: Shrublands; bowgada & *Acacia quadrimarginea* on stony ridges.<br>• 363: Shrublands; bowgada scrub with scattered cypress pine.<br><br>Multiple flora and vegetation survey was conducted over the application area, must recent surveys include, Woodman Environmental Consulting, starting in September, through to December 2008. In 2010, Woodman Environmental Consulting, carried out further survey work from September, to December, and January 2011 (Woodman, 2009; 2012). The application area was also included an additional targeted and detailed flora survey by Woodman Environmental Consulting in 2020 where field work was carried out in August and September of that year. The following vegetation associations were recorded within the application area (Woodman, 2021):<br>• 3: Tall open shrubland to sparse shrubland of mixed species dominated by *Acacia tetragonophylla*, *Eremophila oldfieldii* subsp. *oldfieldii* and occasionally *Acacia acuminata*/*Acacia burkittii* over mid open shrubland to sparse shrubland of mixed species dominated by *Dodonaea inaequifolia* and *Acacia ramulosa* var. *ramulosa* over low sparse shrubland of mixed species dominated by *Ptilotus obovatus* var. *obovatus*, *Scaevola spinescens* and *Sida* sp. dark green fruits (S. van Leeuwen 2260) on red-brown, red or brown clay loam and silty loam with ironstone and quartz stones on slopes of low hills and plains.<br>• 5: Low open woodland of *Eucalyptus loxophleba* subsp. s*upralaevis* over tall open to sparse shrubland of mixed species including *Acacia obtecta* and *Acacia ramulosa* var. *ramulosa* over mid open shrubland to sparse shrubland of mixed species including *Acacia tetragonophylla* over low sparse shrubland of mixed species dominated by *Rhagodia drummondii*, *Ptilotus obovatus* var. *obovatus*, *Senna artemisioides* subsp. *filifolia* and occasionally *Sida* sp. dark green fruits (S. van Leeuwen 2260) over low sparse chenopod shrubland of mixed species dominated by *Sclerolaena fusiformis* and occasionally *Maireana carnosa* and *Sclerolaena diacantha* on red-brown or red silty clay loam and sandy clay with ironstone and quartz stones on flats and plains. 10: Tall closed shrubland to tall open shrubland of mixed *Acacia* spp dominated by *Acacia assimilis* subsp. *assimilis* over mid open shrubland to mid sparse shrubland of mixed species including *Aluta aspera* subsp. *hesperia*, *Eremophila l*atrobei subsp. *latrobei* and *Philotheca sericea* on red or red-brown silty clay loam or clay loam with ironstone gravel on flats to crests (primarily midslopes).<br>• 8: Low open woodland of *Eucalyptus salubris* over low sparse chenopod shrubland of mixed species dominated by *Maireana carnosa*, Sclerolaena fusiformis and *Maireana trichoptera* on red-brown or red clay loam and clayey sand with ironstone, quartz and granite stones on plains and minor depression areas.<br>• 10: Low open woodland of mixed species dominated by *Eucalyptus kochii* subsp. *amaryssia*/*Eucalyptus kochii* subsp. *plenissima* and/or *Eucalyptus loxophleba* subsp. *supralaevis* over tall sparse shrubland to open shrubland of mixed species including *Acacia latior*, *Acacia sibina*, *Acacia ramulosa* var. *ramulosa* and *Melaleuca leiocarpa* over mid sparse shrubland of mixed species dominated by *Acacia tetragonophylla* and occasionally *Acacia* assimilis subsp. *assimilis*, *Philotheca brucei* subsp. *brucei*, *Hakea recurva* subsp. *recurva* and *Alyxia buxifolia* over low sparse shrubland of mixed species dominated by *Ptilotus obovatus* var. *obovatus*, *Rhagodia drummondii* and occasionally *Olearia humilis*, *Sida* sp. dark green fruits (S. van Leeuwen 2260) and *Acacia exocarpoides* on red-brown or red clay loam and sandy clay loam with ironstone and quartz stones on flats, plains, and slopes and crests of low hills.<br>• 17: Tall sparse shrubland of mixed species including *Acacia tetragonophylla*, *Acacia umbraculiformis* and *Acacia acuminata*/*Acacia burkittii* over mid sparse shrubland of mixed species including *Thryptomene costata* and *Acacia kochii* over low sparse shrubland of mixed species including *Ptilotus obovatus* var. *obovatus* and *Solanum lasiophyllum* over low open forbland to sparse forbland of mixed species dominated by *Borya sphaerocephala* and occasionally *Goodenia rosea*, *Erodium cygnorum* and |

<table>
<tr><th>Characteristic</th><th>Details</th></tr>
<tr><td></td><td>*Pentameris airoides subsp. airoides on red, red-brown or brown clay loam and sandy clay with granite, ironstone and quartz stones and occasionally with granite outcropping on slopes of low hills, flats and plains. low sparse forbland of Borya sphaerocephala on red-brown clay loam on slopes with granite or ironstone outcropping.</td></tr>
<tr><td>Vegetation condition</td><td>The vegetation surveys (Woodman, 2012) indicate the remaining vegetation within the proposed clearing area is in Excellent (Keighery, 1994) condition, described as:<ul><li>Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive.</li></ul>The full Keighery (1994) condition rating scale is provided in Appendix C.<br>Representative photos and the full survey descriptions are available in Appendix D.</td></tr>
<tr><td>Climate</td><td>Mean monthly temperature ranges from 18.9 degrees centigrade in July to 37.5 degrees centigrade in January (BOM, 2025).<br>Mean monthly rainfall ranges from 57.2 millimetres in June to 7.8 in December. Mean annual rainfall is 328.5 millimetres (BOM, 2025).</td></tr>
<tr><td>Soil description and landform</td><td>The soil and landscape systems mapped within application area are tabulated below (GIS Database):
<table>
<tr><th>Landscape system name</th><th>Landscape description</th><th>Soil description</th></tr>
<tr><td>Joseph</td><td>Undulating yellow sandplain supporting dense mixed acacia, melaleuca and casuarina shrublands with patchy mallees.</td><td>Yellow deep sand</td></tr>
<tr><td>Nerramyne</td><td>Undulating plains of sandy-surfaced laterite and weathered granite with low remnant plateaux, breakaways and rises supporting acacia shrublands.</td><td>Red shallow sand</td></tr>
<tr><td>Yowie</td><td>Sandy plains supporting tall shrublands of mulga and bowgada with patchy wanderrie grasses.</td><td>Red deep sand</td></tr>
</table></td></tr>
<tr><td>Land degradation risk</td><td>Limited soil risk data exists for the soil, landscape systems mapped within the application area, please refer to section A3 below.</td></tr>
<tr><td>Waterbodies</td><td>An assessment of GIS databases and aerial imagery indicated that application area transects one minor non-perennial waterline. The nearest other water body is an unnamed non-perennial lake approximately 5.3 kilometres north east of the application area.</td></tr>
<tr><td>Hydrogeography</td><td>The application area is not within any legislated surface water area. The application area is located within the Gascoyne Ground Water Area proclaimed under the Rights in Water and Irrigation Act 1914. The mapped groundwater salinity is 3000 to >7,000 milligrams per litre total dissolved solids which is described as brackish to saline water quality.</td></tr>
<tr><td>Flora</td><td>According to GIS databases and the surveys carried out by Woodman environmental Consulting (Woodman 2012) there area a total of 46 species of conservation significant flora within the local area (20 kilometre radius if the application area). The above flora are comprised of; three Threatened flora (T), 13 Priority 1, three Priority 2, 26 Priority 3, one Priority 4. The P 3 species Persoonia pentasticha is recorded within the application area. At the time of assessment for clearing permit 3399/1 the small succulent herb Gunniopsis rubra was previously recorded in the application area and considered a Priority 3, however this species is no longer considered a priority species (Florabase 1998).<br>See Section A.2. for a flora habitat suitability analysis of conservation significant flora recorded in the local area.</td></tr>
<tr><td>Ecological communities</td><td>Approximately 0.36 hectares of the Blue Hills (Mount Karara/Mungada Ridge/Blue Hills) vegetation complexes (banded ironstone formation) Priority 1 Ecological Community (PEC), transects the application area. The local area includes 33 records for the above PEC covering an area of approximately 6,861 hectares.</td></tr>
<tr><td>Fauna</td><td>Multiple fauna surveys were conducted over the application area, including Bamford Consulting Ecologists (2007 and 2009), Coffey Environments (2008) and Biologic Environmental Survey (2008).<br>There are six species of conservation significant fauna recorded in the local area, with the nearest record for malleefowl (Leipoa ocellata) and western spiny-tailed skink (Egernia stokesii badia) (Bamford 2009).<br>See Section B.4. for a flora habitat suitability analysis of conservation significant flora recorded in the local area.</td></tr>
</table>

## 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 - Yalgoo | 5,057,325.85 | 4,923,840 | 97.36 | 1,576,718.27 | 31.34 |
| IBRA Subregion - Tallering | 3,498,493.53 | 3,387,092.96 | 96.8 | 872,723.40 | 23.71 |
| Local Government - Perenjori | 830,111.77 | 467,567.91 | 56.33 | 27.86 | 48.41 |
| Local Area (20km radius) | - 137,093.35 | 136460.79 | 98.9 | - | - |
| Beard vegetation associations - State | | | | | |
| Veg Assoc No. *358* | 59,719.25 | 59,576.78 | 99.76 | 21,356.73 | 35.85 |
| Veg Assoc No. 363 | 247,654.95 | 247,469.71 | 99.93 | 197,326.26 | 79.75 |
| Beard vegetation associations - Bioregion | | | | | |
| Veg Assoc No. *358* | 16,473.46 | 16,364.97 | 99.34 | 0 | 0 |
| Veg Assoc No. *363* | 246,250.23 | 246,064.99 | 99.92 | 79.92 | 79.91 |
| Beard vegetation associations - subregion | | | | | |
| Veg Assoc No. *358* | 55,529.71 | 55,447.71 | 99.85 | 17,624.25 | 31.84 |
| Veg Assoc No. *363* | 11,914.55 | 11,729.30 | 98.45 | 11,701.36 | 99.77 |

Government of Western Australia (2019)

## A.3 Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix E.1), and biological survey information impacts to the following conservation significant flora required further consideration. Note records may represent a single individual or a population.

| **Species name** | **Conservation status** | **Suitable habitat features ? [Y/N]** | **Suitable vegetation type? [Y/N]** | **Suitable soil type? [Y/N]** | **Distance of closest record to application area (km)** | **Number of known records (total)** | **Are surveys adequate to identify? [Y, N, N/A]** |
|---|---|---|---|---|---|---|---|
| *Persoonia pentasticha* | P3 | Y | Y | Y | 0.0 | 612 | Y |
| *Rhodanthe collina* | P3 | Y | Y | Y | 0.3 | 996 | Y |
| *Lepidosperma* sp. Blue Hills (A. Markey & S.Dillon 3468) | P1 | N | N | N | 0.4 | 3,396 | Y |
| *Melaleuca barlowii* | P3 | N | N | N | 0.4 | 6 | Y |
| *Petrophile pauciflora* | P3 | N | N | N | 0.5 | 8 | Y |
| *Grevillea globosa* | P3 | Y | Y | Y | 0.6 | 169 | Y |
| *Acacia karinae* | P3 | N | N | N | 0.9 | 3,782 | Y |
| *Grevillea subtiliflora* | P3 | Y | Y | Y | 1.1 | 5 | Y |
| *Calotis* sp. Perrinvale Station (R.J. Cranfield 7096) | P3 | N | N | N | 1.6 | 16 | Y |
| *Millotia dimorpha* | P1 | N | N | N | 1.7 | 91 | Y |
| *Allocasuarina tessellata* | P3 | N | N | N | 2.2 | 61 | Y |
| *Swainsona picta* | P1 | N | N | N | 2.3 | 2 | Y |
| *Micromyrtus trudgenii* | P3 | N | N | N | 2.3 | 2,452 | Y |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Grevillea scabrida* | P3 | N | N | N | 2.3 | 159 | Y |
| *Prostanthera* sp. Karara (D. Coultas & K. Greenacre Opp 8) | P1 | N | N | N | 2.4 | 88 | Y |
| *Menkea draboides* | P3 | N | N | N | 3.5 | 3 | Y |
| *Stenanthemum poicilum* | P3 | Y | Y | Y | 3.5 | 13 | Y |
| *Gunniopsis divisa* | P3 | N | N | N | 4.0 | 77 | Y |
| *Gunniopsis* sp. Blue Hills (D.J. Edinger Nats 59) | P1 | N | N | N | 4.0 | 1 | Y |
| *Persoonia kararae* | P2 | N | N | N | 5.8 | 3 | Y |
| *Drummondita fulva* | P3 | N | N | N | 6.6 | 1,204 | Y |
| *Eucalyptus synandra* | T | N | N | N | 6.6 | 9 | Y |
| *Cyanicula fragrans* | P3 | N | N | N | 6.7 | 1 | Y |
| *Caesia* sp. Koolanooka Hills (R. Meissner & Y. Caruso 78) | P1 | N | N | N | 7.2 | 3 | Y |
| *Hemigenia tichbonii* | P1 | N | N | N | 7.2 | 2 | Y |
| *Pterostylis arida* | P3 | N | N | N | 7.5 | 1 | Y |
| *Acacia woodmaniorum* | T | N | N | N | 7.5 | 7,890 | Y |
| *Micromyrtus acuta* | P3 | N | N | N | 7.8 | 262 | Y |
| *Angianthus prostratus* | P3 | N | N | N | 8.7 | 2 | Y |
| *Chamelaucium* sp. Warriedar (A.P. Brown & S. Patrick APB 1100) | P1 | N | N | N | 10.5 | 9 | Y |
| *Polianthion collinum* | P3 | N | N | N | 11.3 | 577 | Y |
| *Acacia diallaga* | P1 | N | N | N | 11.4 | 4 | Y |
| *Grevillea leptopoda* | P3 | N | N | N | 11.4 | 1 | Y |
| *Xanthoparmelia subimitatrix* | P3 | N | N | N | 11.7 | 1 | Y |
| *Eremophila sericea* | P1 | N | N | N | 11.9 | 5 | Y |
| *Eremophila oldfieldii subsp. papula* | P1 | N | N | N | 12.2 | 2 | Y |
| *Eucalyptus jutsonii subsp. kobela* | P1 | N | Y | N | 12.8 | 13 | Y |
| *Xanthoparmelia nashii* | P3 | N | N | N | 13.0 | 1 | Y |
| *Calandrinia kalanniensis* | P2 | N | N | N | 13.8 | 3 | Y |
| *Calandrinia* sp. Warriedar (F. Obbens 04/09) | P2 | N | N | N | 14.0 | 3 | Y |
| *Stylidium scintillans* | T | N | N | N | 14.1 | 78 | Y |
| Bossiaea sp. Jackson Range (G. Cockerton & S. McNee LCS 13614) | P3 | N | N | N | 15.7 | 1 | Y |
| *Gnephosis setifera* | P1 | N | N | N | 17.0 | 1 | Y |
| *Xanthoparmelia dayiana* | P3 | N | N | N | 17.4 | 1 | Y |
| *Wurmbea murchisoniana* | P4 | N | N | N | 18.4 | 1 | Y |
| *Psammomoya implexa* | P3 | N | N | N | 18.9 | 1 | Y |

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

### A.4 Fauna analysis table

| Species name | Conservation status | Suitable habitat features? [Y/N] | Suitable vegetation type? [Y/N] | Distance of closest record to application area (km) | Number of known records (total) | Are surveys adequate to identify? [Y, N, N/A] |
|---|---|---|---|---|---|---|
| malleefowl (*Leipoa ocellata*) | VU | Y | Y | 0 | 58 | Y |
| western spiny-tailed skink (*Egernia stokesii badia*) | VU | Y | Y | 0 | 34 | Y |
| northern shield-backed trapdoor spider (Idiosoma clypeatum) | P3 | Y | Y | 0.7 | 240 | Y |
| western brush wallaby (*Notamacropus Irma*) | P4 | Y | Y | 2.2 | 1 | Y |
| ornate shield-backed trapdoor spider (Idiosoma formosum) | EN | Y | Y | 7.3 | 1 | Y |
| night parrot (Pezoporus occidentalis) | CR | N | N | 15.7 | 1 | N |

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

### A.5 Land degradation risk table

| Risk categories | *Joseph* | *Nerramyne* | *Yowie* |
|---|---|---|---|
| Wind erosion | No Data | No Data | No Data |
| Water erosion | No Data | No Data | No Data |
| Salinity | 0% of map unit has a moderate to extreme risk | 0% of map unit has a moderate to extreme risk | 0% of map unit has a moderate to extreme risk |
| Subsurface Acidification | 80% of map unit has a high susceptibility | 5% of map unit has a high susceptibility | 45% of map unit has a high susceptibility |
| Flood risk | No Data | No Data | No Data |
| Water logging | No Data | No Data | No Data |
| Phosphorus export risk | No Data | No Data | No Data |

## Appendix B. Assessment against the clearing principles

| Assessment against the clearing principles | Variance level | Is further consideration required? |
|---|---|---|
| **Environmental value: biological values** | | |
| Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."*<br>Assessment:<br>The area proposed to be cleared contains a record for the priority 3 flora species *Persoonia pentasticha*.<br>A portion of the application area is mapped as the 'Approximately 0.36 hectares of the Blue Hills (Mount Karara/Mungada Ridge/Blue Hills) vegetation complexes (banded ironstone formation) Priority 1 Ecological Community (PEC). | May be at variance | Yes<br>*Refer to Section 3.2.1, above.* |
| Principle (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."*<br>Assessment:<br>The area proposed to be cleared contains, evidence of breeding habitat, for malleefowl (*Leipoa ocellata*) categorised as Vulnerable and may contain spiny-tailed skink (*Egernia stokesii badia*) also categorised as Vulnerable | May be at variance | Yes<br>*Refer to Section 3.2.1, above.* |
| Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."*<br>Assessment:<br>The area proposed to be cleared has been extensively surveyed and is unlikely to contain the three threatened flora recorded on the local area, listed under the BC Act (*Acacia woodmaniorum*, *Eucalyptus synandra* and *Stylidium scintillans*) | Not likely to be at variance | No |
| Principle (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."*<br>Assessment:<br>The area proposed to be cleared does not contain species that can indicate a threatened ecological community. A threatened ecological community as defined in the Biodiversity Conservation Act 2016 section 5(1); or (b) any other ecological community listed, designated or declared as threatened, endangered or vulnerable under or for the purposes of a written law; or (c) a listed threatened ecological community as defined in the Commonwealth Environment Act section 528. | Not likely to be at variance | No |
| **Environmental value: significant remnant vegetation and conservation areas** | | |

| Assessment against the clearing principles | Variance level | Is further consideration required? |
|---|---|---|
| Principle (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."*<br><br>Assessment:<br><br>The extent of the native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area. The proposed clearing will not reduce the extent of Beard Vegetation Associations 358 and 363 below the current recognised threshold level of 30% of the pre-clearing extent of the vegetation type (below which species loss accelerates exponentially at an ecosystem level) (Government of Western Australia 2019) | Not at variance | No |
| Principle (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."*<br><br>Assessment:<br><br>According to available databases, the application area is located within a conservation reserve (GIS Database). The application area is located on the former Karara pastoral lease which has been purchased by the DEC for the purpose of conservation. The Karara pastoral lease contains banded ironstone formations including the Blue Hills (Mount Karara/Mungada Ridge/Blue Hills) vegetation complexes (banded ironstone formation) Priority 1 PEC. The Banded ironstone formations also comprise a high level of floristic diversity (Government of Western Australia, 2000). | Not likely to be at variance | No |
| **Environmental value: land and water resources** | | |
| Principle (f): *"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."*<br><br>Assessment:<br><br>According to available databases, there is one minor, non perennial watercourse that crosses the application area (GIS Database). The vegetation survey did not identify any vegetation types associated with a watercourse within the application area (Karara Mining, 2009). Karara Mining plans to install environmental culverts to maintain existing flow paths (Karara Mining, 2009). Given no water courses or wetlands are recorded within 5.3 kilometres of the application area, the proposed clearing is unlikely to impact onsite or offsite hydrology and water quality. | Not likely to be at variance | No |
| Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."*<br><br>Assessment:<br><br>Data indicating susceptibility to wind/water erosion, flood risk, water logging and nutrient export, within the application area is limited. However, given the condition of adjacent vegetation, and limited drainage in application area the proposed clearing is not likely to have an appreciable impact on land degradation. | Not likely to be at variance | No |
| Principle (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."*<br><br>Assessment:<br><br>The application area is not located within *a* Public Drinking Water Source. Given the limited rainfall and limited surface drainage, it is unlikely the quality of surface water or underground water has deteriorated since the assessment of the local area under amendment CPS 3399/3. | Not likely to be at variance | No |

| Assessment against the clearing principles | Variance level | Is further consideration required? |
|---|---|---|
| Principle (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."*<br><br>Assessment:<br><br>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.<br><br>Given the low annual rainfall and limited drainage in the application area proposed remaining clearing is unlikely to contribute to waterlogging. | Not likely to be at variance | No |

## Appendix C. Vegetation condition rating scale

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

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

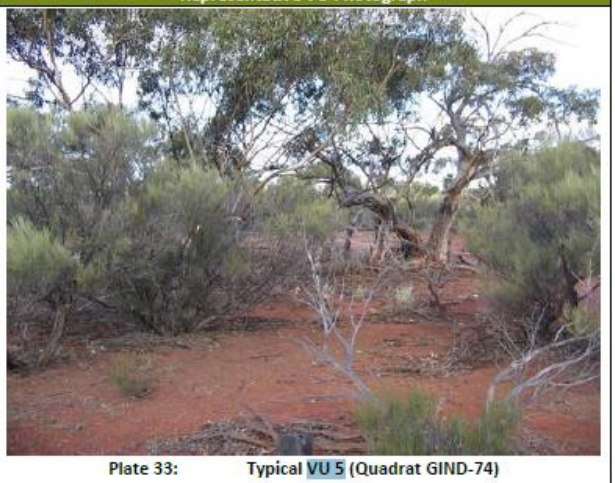
**Measuring vegetation condition for the South West and Interzone Botanical Province (Keighery, 1994)**

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

## Appendix D. Biological survey information excerpts From Woodman (2022)

Vegetation within the application area

| VU | Summary from Quadrat Data | Representative VU Photograph |
|---|---|---|
| 3 | **Description:** Tall open shrubland to sparse shrubland of mixed species dominated by *Acacia tetragonophylla*, *Eremophila oldfieldii* subsp. *oldfieldii* and occasionally *Acacia acuminata/Acacia burkittii* over mid open shrubland to sparse shrubland of mixed species dominated by *Dodonaea inaequifolia* and *Acacia ramulosa var. ramulosa* over low sparse shrubland of mixed species dominated by *Ptilotus obovatus* var. *obovatus*, *Scaevola spinescens* and *Sida* sp. dark green fruits (S. van Leeuwen 2260) on red-brown, red or brown clay loam and silty loam with ironstone and quartz stones on slopes of low hills and plains<br><br>**Area mapped (proportion of Study Area):** 187 ha (0.9 %)<br><br>**Sampling:** 6 quadrats (GIND-92, GIND-93, GIND-96, KIOP 001, KIOP 003, KML07)<br><br>**Average Native Perennial Taxon Richness per Quadrat:** 17 ± 3<br><br>**Indicator Taxa:** *Eremophila oldfieldii* subsp. *oldfieldii*, *Grevillea scabrida* (P3)<br><br>**Significant Taxa:** *Acacia karina* (P1)^, *Grevillea scabrida* (P3)^, *Rhodanthe collina* (P3)^<br><br>**Variation:** This VU was generally structurally and compositionally uniform, although two quadrats possessed a low open woodland stratum of *Eucalyptus loxophleba* subsp. *supralaevis* and *Eucalyptus clelandiorum* |  <br>**Plate 31: Typical VU 3 (Quadrat GIND-92)** |

| VU | Summary from Quadrat Data | Representative VU Photograph |
|---|---|---|
| 5 | **Description:** Low open woodland of *Eucalyptus loxophleba* subsp. *supralaevis* over tall open to sparse shrubland of mixed species including *Acacia obtecta* and *Acacia ramulosa* var. *ramulosa* over mid open shrubland to sparse shrubland of mixed species including *Acacia tetragonophylla* over low sparse shrubland of mixed species dominated by *Rhagodia drummondii*, *Ptilotus obovatus* var. *obovatus*, *Senna artemisioides subsp. filifolia* and occasionally *Sida* sp. dark green fruits (S. van Leeuwen 2260) over low sparse chenopod shrubland of mixed species dominated by *Sclerolaena fusiformis* and occasionally *Maireana carnosa* and *Sclerolaena diacantha* on red-brown or red silty clay loam and sandy clay with ironstone and quartz stones on flats and plains<br><br>**Area mapped (proportion of Study Area):** 3,144 ha (15.4 %)<br><br>**Sampling:** 14 quadrats (GIND-15, GIND-21, GIND-46, GIND-56, GIND-74, GIND-83, KIOP 006, KIOP 217, KIOP 316, KIOP 468, KML05, KML16, KMLL03, KMLL05)<br><br>**Average Native Perennial Taxon Richness per Quadrat:** 16 ± 4<br><br>**Indicator Taxa:** No statistically significant indicator taxa<br><br>**Significant Taxa:** No significant taxa recorded in quadrats<br><br>**Variation:** This VU was generally compositionally uniform across the Study Area, although there was some minor structural variation. The upper woodland stratum of this VU was typically quite uniform, although *Eucalyptus kochii* subsp. *amaryssia/Eucalyptus kochii* subsp. *plenissima* was the only tree taxon present in quadrat KIOP 217 while GIND-56 did not possess this stratum at all. There was some variation in the density of the tall, mid and low shrubland strata; for example, quadrat GIND-46 did not possess a mid shrubland stratum and had sparse tall and low shrubland strata (Plate 34) |  <br>**Plate 33: Typical VU 5 (Quadrat GIND-74)** |

| VU | Summary from Quadrat Data | Representative VU Photograph |
|---|---|---|
| 8 | **Description:** Low open woodland of *Eucalyptus salubris* over low sparse chenopod shrubland of mixed species dominated by *Maireana carnosa*, *Sclerolaena fusiformis* and *Maireana trichoptera* on red-brown or red clay loam and clayey sand with ironstone, quartz and granite stones on plains and minor depression areas<br><br>**Area mapped (proportion of Study Area):** 54 ha (0.3 %)<br><br>**Sampling:** 2 quadrats (KIOP 195, KML11)<br><br>**Average Native Perennial Taxon Richness per Quadrat:** 12 ± 1<br><br>**Indicator Taxa:** *Atriplex codonocarpa*, *Eucalyptus salubris*, *Maireana trichoptera*, *Olearia muelleri*<br><br>**Significant Taxa:** No significant taxa recorded in quadrats<br><br>**Variation:** There was little structural and compositional variation in this VU based on the limited area mapped in the Study Area |  <br>**Plate 38: Typical VU 8 (Quadrat KML11)** |

| VU | Summary from Quadrat Data | Representative VU Photograph |
|---|---|---|
| 10 | **Description:** Low open woodland of mixed species dominated by *Eucalyptus kochii* subsp. *amaryssia*/*Eucalyptus kochii* subsp. *plenissima* and/or *Eucalyptus loxophleba* subsp. *supralaevis* over tall sparse shrubland to open shrubland of mixed species including *Acacia latior*, *Acacia sibina*, *Acacia ramulosa* var. *ramulosa* and *Melaleuca leiocarpa* over mid sparse shrubland of mixed species dominated by *Acacia tetragonophylla* and occasionally *Acacia assimilis* subsp. *assimilis*, *Philotheca brucei* subsp. *brucei*, *Hakea recurva* subsp. *recurva* and *Alyxia buxifolia* over low sparse shrubland of mixed species dominated by *Ptilotus obovatus* var. *obovatus*, *Rhagodia drummondii* and occasionally *Olearia humilis*, *Sida* sp. dark green fruits (S. van Leeuwen 2260) and *Acacia exocarpoides* on red-brown or red clay loam and sandy clay loam with ironstone and quartz stones on flats, plains, and slopes and crests of low hills<br><br>**Area mapped (proportion of Study Area):** 2,275 ha (11.1 %)<br><br>**Sampling:** 31 quadrats (GIND-10, GIND-11, GIND-24, GIND-25, GIND-33, GIND-60, GIND-78, GINM-02, KARA15, KARA18, KIOP 140, KIOP 159, KIOP 274, KIOP 276, KK03, KML04, KML06, KML13, KML14, KML19, KML20, KML26, KML30, KML32, KML34, KML36, KML37, KML38, WIND10, WIND13, WIND16)<br><br>**Average Native Perennial Taxon Richness per Quadrat:** 16 ± 5<br><br>**Indicator Taxa:** *Eucalyptus kochii* subsp. *amaryssia*/*Eucalyptus kochii* subsp. *plenissima*, *Olearia humilis*<br><br>**Significant Taxa:** *Micromyrtus trudgenii* (P3), *Persoonia pentasticha* (P3)^, *Stenanthemum poicilum* (P3)^<br><br>**Variation:** This VU demonstrated some variation relating to differences in landscape position and topography. A small number of quadrats were missing the upper woodland stratum (e.g. Plate 41); these quadrats were typically located on or near lateritic and/or ironstone crests and had shallow soil profiles. These quadrats also contained some taxa typical of more rocky habitats that were not recorded elsewhere in the VU, including the significant taxon *Micromyrtus trudgenii* (P3). The species composition of quadrat GIND-60 was slightly atypical for this VU, likely being influenced by its proximity to the edge of a saline depression. These variations are |  <br>**Plate 40: Typical VU 10 (Quadrat GIND-11)** |

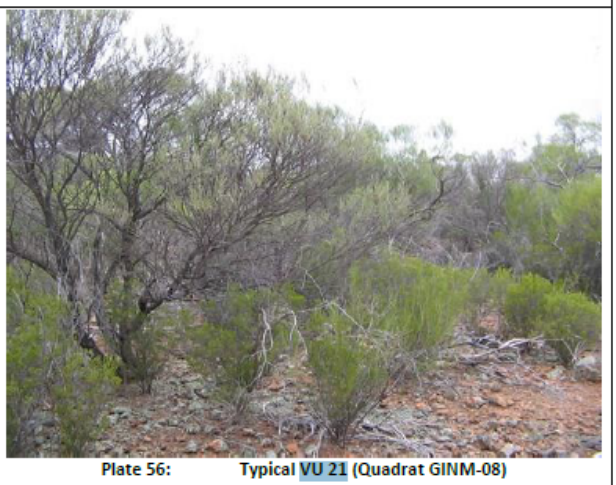
| VU | Summary from Quadrat Data | Representative VU Photograph |
|---|---|---|
| 17 | **Description:** Tall sparse shrubland of mixed species including *Acacia tetragonophylla*, *Acacia umbraculiformis* and *Acacia acuminata/Acacia burkittii* over mid sparse shrubland of mixed species including *Thryptomene costata* and *Acacia kochii* over low sparse shrubland of mixed species including *Ptilotus obovatus* var. *obovatus* and *Solanum lasiophyllum* over low open forbland to sparse forbland of mixed species dominated by *Borya sphaerocephala* and occasionally *Goodenia rosea*, *Erodium cygnorum* and **Pentameris airoides* subsp. *airoides* on red, red-brown or brown clay loam and sandy clay with granite, ironstone and quartz stones and occasionally with granite outcropping on slopes of low hills, flats and plains<br><br>**Area mapped (proportion of Study Area):** 672 ha (3.3 %)<br><br>**Sampling:** 15 quadrats (GIND-71, GINM-05, GINM-07, KIOP 137, KIOP 138, KIOP 192, KIOP 223, KIOP 225, KIOP 238, KIOP 239, KIOP 267, KK06, KML24, KML25, KML29)<br><br>**Average Native Perennial Taxon Richness per Quadrat:** 10 ± 3<br><br>**Indicator Taxa:** No statistically significant indicator taxa<br><br>**Significant Taxa:** *Austrostipa blackii* (P3), *Grevillea subtiliflora* (P3)^<br><br>**Variation:** This VU was generally compositionally uniform, although there was some structural variation. A number of quadrats lacked either an upper shrubland stratum (Plate 51) or mid shrubland stratum while one quadrat (KML25) located in an open area surrounding a granite outcrop lacked shrubland strata entirely. The species richness of annual taxa in this VU was generally quite high, with quadrat KML24 containing the maximum for this VU at 34 annual taxa species |  <br>**Plate 50: Typical VU 17 (Quadrat KML29)**<br>  |

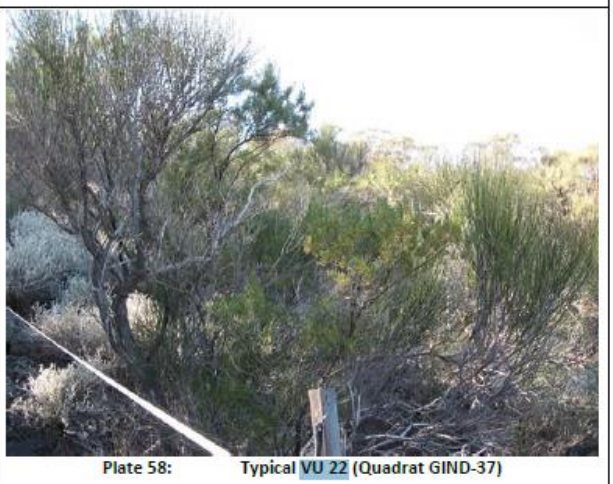
Vegetation types analogous with the Blue Hills (Mount Karara/Mungada Ridge/Blue Hills) vegetation complexes (banded ironstone formation) Priority 1 Ecological Community (PEC).

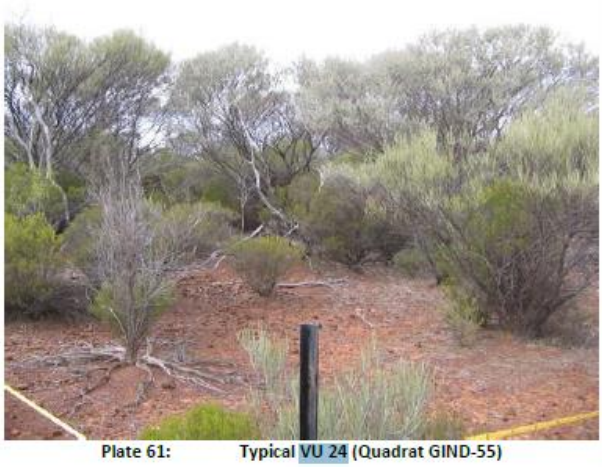
| VU | Summary from Quadrat Data | Representative VU Photograph |
|---|---|---|
| 16 | **Description:** Tall open shrubland to sparse shrubland of mixed species dominated by *Acacia ramulosa* var. *ramulosa*, *Acacia tetragonophylla*, *Hakea recurva subsp. recurva* and occasionally *Acacia acuminata/Acacia burkittii* over low sparse shrubland of mixed species including *Solanum lasiophyllum*, *Ptilotus obovatus* var. *obovatus*, *Sida* sp. dark green fruits (S. van Leeuwen 2260) and *Eremophila eriocalyx* over low sparse forbland of mixed species including *Borya sphaerocephala*, *Podolepis lessonii*, *Myriocephalus guerinae* and *Gilruthia osbornei* on red, red-brown or brown clay loam and sandy clay loam with granite, ironstone, quartz and laterite stones and occasionally with granite, dolerite or laterite outcropping on plains, slopes of low hills and drainage lines<br><br>**Area mapped (proportion of Study Area):** 818 ha (4.0 %)<br><br>**Sampling:** 12 quadrats (GIND-14, GINM-12, KARA16, KIOP 005, KIOP 023, KIOP 173, KIOP 180, KIOP 214, KIOP 216, KIOP 240, KML08, KML28)<br><br>**Average Native Perennial Taxon Richness per Quadrat:** 11 ± 3<br><br>**Indicator Taxa:** *Acacia ramulosa* var. *ramulosa*<br><br>**Significant Taxa:** *Calotis* sp. Perrinvale Station (R.J. Cranfield 7096) (P3), *Persoonia pentasticha* (P3)<br><br>**Variation:** This VU was generally structurally and compositionally uniform across the Study Area. Quadrat GINM-12 was manually grouped with this VU. This quadrat was located on an outwash plain and was relatively comparatively species poor but otherwise exhibited a composition that was consistent with the typical VU 16 (Plate 49) (Appendix P) |  <br>**Plate 48: Typical VU 16 (Quadrat KIOP 216)** |

| VU | Summary from Quadrat Data | Representative VU Photograph |
|---|---|---|
| 19 | **Description:** Tall shrubland to open shrubland of mixed species including *Calycopeplus paucifolius*, *Acacia acuminata/Acacia burkittii*, *Acacia aneura* spp., *Hakea recurva* subsp. *recurva*, *Melaleuca nematophylla* and *Allocasuarina acutivalvis* subsp. *prinsepiana* over mid open shrubland of mixed species dominated by *Acacia exocarpoides*, *Eremophila latrobei* subsp. *latrobei*, *Eremophila clarkei*, *Philotheca brucei* subsp. *brucei* and *Philotheca sericea* over low open shrubland to sparse shrubland of mixed species including *Sida* sp. dark green fruits (S. van Leeuwen 2260), *Mirbelia* sp. Bursarioides (T.R. Lally 760) and *Xanthosia kochii* on red-brown or red silty loam and silty clay loam with BIF stones and BIF outcropping on moderately inclined to steep upper slopes and crests<br><br>**Area mapped (proportion of Study Area):** 68 ha (0.3 %)<br><br>**Sampling:** 7 quadrats (GIND-04, GIND-28, GIND-43, GIND-49, GIND-54, KARA17, WIND02)<br><br>**Average Native Perennial Taxon Richness per Quadrat:** 20 ± 3<br><br>**Indicator Taxa:** *Comesperma integerrimum*, *Sida* sp. dark green fruits (S. van Leeuwen 2260)<br><br>**Significant Taxa:** *Acacia karina* (P1)^, *Acacia woodmaniorum* (T)^, *Drummondita fulva* (P3)^, *Lepidosperma* sp. Blue Hills (A. Markey & S. Dillon 3468) (P1)^, *Micromyrtus trudgenii* (P3)^, *Rhodanthe collina* (P3)<br><br>**Variation:** This VU was generally quite compositionally uniform, although there was some variation in the density of the tall and mid shrubland strata. Most quadrats possessed relatively dense tall and mid shrubland strata, although a small number were comparatively more open (including GIND-04, Plate 54). Generally, quadrats that straddled crests had more open tall and mid shrubland strata than those situated on upper slopes |  <br>**Plate 54: Typical VU 19 (Quadrat GIND-04)** |

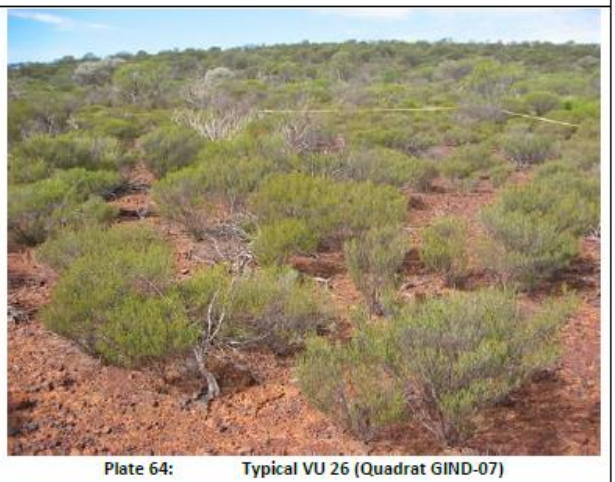
| VU | Summary from Quadrat Data | Representative VU Photograph |
|---|---|---|
| 20 | **Description:** Tall shrubland to open shrubland of mixed species including *Calycopeplus paucifolius*, *Acacia aneura* spp., *Acacia ramulosa* var. *ramulosa*, *Acacia sibina* and *Allocasuarina acutivalvis* subsp. *prinsepiana* over mid open shrubland of mixed species dominated by *Philotheca sericea*, *Micromyrtus trudgenii* (P3), *Eremophila clarkei* and *Eremophila latrobei* subsp. *latrobei* over low open shrubland of mixed species including *Ptilotus obovatus* var. *obovatus*, *Acacia exocarpoides*, *Acacia woodmaniorum* (T) and *Prostanthera patens* over low sparse forbland of mixed species including *Trachymene ornata*, *Calandrinia eremaea*, *Crassula tetramera* and *Rhodanthe battii* on red clay loam with BIF stones and generally with BIF outcropping on gently inclined to very steep lower slopes, upper slopes and crests<br><br>**Area mapped (proportion of Study Area):** 61 ha (0.3 %)<br><br>**Sampling:** 6 quadrats (GIND-38, KIOP 480, WIND04, WIND14, WIND18, WIND19)<br><br>**Average Native Perennial Taxon Richness per Quadrat:** 17 ± 6<br><br>**Indicator Taxa:** *Micromyrtus trudgenii* (P3), *Philotheca sericea*<br><br>**Significant Taxa:** *Acacia woodmaniorum* (T)^, *Micromyrtus trudgenii* (P3)^, *Polianthion collinum* (P3)^<br><br>**Variation:** While the lower strata of this VU were generally quite compositionally uniform, the composition of the tall shrubland stratum varied somewhat. In addition, quadrat KIOP 480 located lower in the landscape was more species poor than the remaining five quadrats. However, the taxa that were present within this quadrat were relatively consistent with the typical VU 20 |  <br>**Plate 55: Typical VU 20 (Quadrat GIND-38)** |

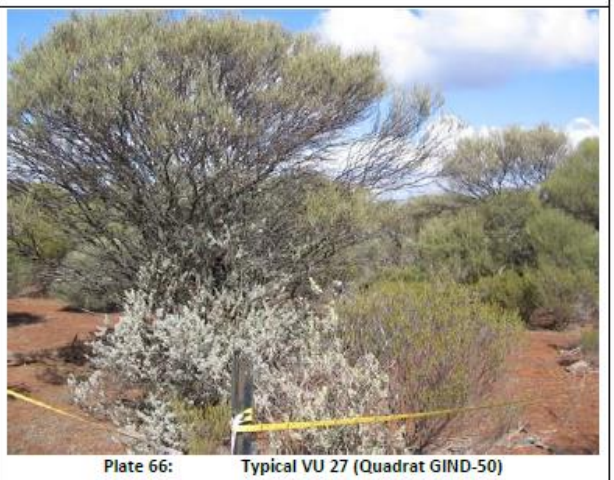
| VU | Summary from Quadrat Data | Representative VU Photograph |
|---|---|---|
| 21 | **Description:** Tall shrubland to open shrubland of mixed species including *Acacia umbraculiformis*, *Acacia assimilis* subsp. *assimilis*, *Acacia aneura* spp. and *Allocasuarina acutivalvis* subsp. *prinsepiana* over mid shrubland to open shrubland of mixed species dominated by *Philotheca sericea*, *Mirbelia* sp. Bursarioides (T.R. Lally 760), *Eremophila clarkei* and *Eremophila latrobei* subsp. *latrobei* over low open shrubland to sparse shrubland of mixed species dominated by *Styphelia serratifolia*, *Hibbertia arcuata*, *Xanthosia kochii* and occasionally *Prostanthera patens* and *Acacia andrewsii* on red-brown silty clay loam and silty loam with BIF or granite stones and BIF or granite outcropping on gently inclined to steep mid slopes, upper slopes, crests and breakaways<br><br>**Area mapped (proportion of Study Area):** 368 ha (1.8 %)<br><br>**Sampling:** 11 quadrats (GIND-32, GIND-34, GIND-35, GIND-48, GINM-01, GINM-08, GINM-14, WIND08, WIND09, WIND12, WIND15)<br><br>**Average Native Perennial Taxon Richness per Quadrat:** 24 ± 6<br><br>**Indicator Taxa:** *Acacia andrewsii*, *Drummondita fulva* (P3), *Polianthion collinum* (P3), *Styphelia serratifolia*<br><br>**Significant Taxa:** *Austrostipa blackii* (P3), *Calotis* sp. Perrinvale Station (R.J. Cranfield 7096) (P3)^, *Drummondita fulva* (P3)^, *Lepidosperma* sp. Blue Hills (A. Markey & S. Dillon 3468) (P1)^, *Micromyrtus acuta* (P3)^, *Micromyrtus trudgenii* (P3)^, *Persoonia pentasticha* (P3), *Polianthion collinum* (P3)^, *Rhodanthe collina* (P3)^<br><br>**Variation:** This VU was generally quite uniform, although there were minor compositional differences in quadrats located higher in the landscape on the main part of Mungada Ridge than those located lower in the landscape. In addition, two quadrats contained low isolated clumps of trees of *Eucalyptus leptopoda* subsp. *arctata* and *Eucalyptus ewartiana* (Plate 57). Quadrat GINM-01 was manually grouped with this VU. This quadrat was located on a granite breakaway with pale brown sandy clay loam. Despite the difference in geology of this quadrat with the typical VU, it had |  <br>**Plate 56: Typical VU 21 (Quadrat GINM-08)** |

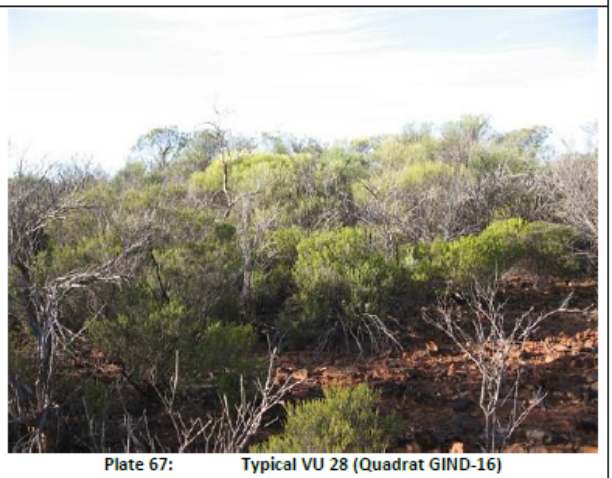
| VU | Summary from Quadrat Data | Representative VU Photograph |
|---|---|---|
| 22 | **Description:** Low isolated clumps of trees of *Eucalyptus petraea* over tall shrubland to open shrubland of mixed species dominated by *Allocasuarina acutivalvis* subsp. *prinsepiana*, *Calycopeplus paucifolius*, *Alyxia buxifolia* and *Persoonia hexagona* over mid shrubland to open shrubland of mixed species dominated by *Acacia tetragonophylla*, *Dodonaea inaequifolia*, *Acacia exocarpoides*, *Eremophila clarkei* and *Hakea recurva* subsp. *recurva* over low open shrubland to sparse shrubland of mixed species dominated by *Acacia woodmaniorum* (T), *Ptilotus obovatus* var. *obovatus*, *Eremophila serrulata*, *Hemigenia yalgensis* and *Prostanthera magnifica* on red-brown clay loam with BIF stones and generally with BIF outcropping on moderately inclined to steep upper slopes and crests<br><br>**Area mapped (proportion of Study Area):** 17 ha (0.1 %)<br><br>**Sampling:** 3 quadrats (GIND-36, GIND-37, WIND05)<br><br>**Average Native Perennial Taxon Richness per Quadrat:** 19 ± 3<br><br>**Indicator Taxa:** *Acacia exocarpoides*, *Acacia tetragonophylla*, *Acacia woodmaniorum* (T), *Alyxia buxifolia*, *Dodonaea inaequifolia*, *Eremophila serrulata*, *Eucalyptus petraea*, *Hemigenia yalgensis*, *Persoonia hexagona*, *Prostanthera magnifica*<br><br>**Significant Taxa:** *Acacia woodmaniorum* (T)^, *Rhodanthe collina* (P3)^<br><br>**Variation:** This VU was generally structurally and compositionally uniform |  <br>**Plate 58: Typical VU 22 (Quadrat GIND-37)** |

| VU | Summary from Quadrat Data | Representative VU Photograph |
|---|---|---|
| | | |
| 24 | **Description:** Tall shrubland to open shrubland of mixed species including *Acacia assimilis* subsp. *assimilis*, *Acacia aneura* spp., *Acacia ramulosa* var. *ramulosa*, *Grevillea obliquistigma* subsp. *obliquistigma* and occasionally *Acacia acuminata/Acacia burkittii* over mid shrubland to open shrubland of mixed species dominated by *Eremophila latrobei* subsp. *latrobei*, *Philotheca sericea*, *Mirbelia* sp. Bursarioides (T.R. Lally 760) and *Eremophila clarkei* over low open shrubland to sparse shrubland of mixed species including *Hibbertia arcuata*, *Prostanthera magnifica* and *Xanthosia kochii* on red-brown or brown silty clay loam with BIF and ironstone stones and occasionally with BIF and ironstone outcropping on slopes, crests and ridges<br><br>**Area mapped (proportion of Study Area):** 512 ha (2.5 %)<br><br>**Sampling:** 11 quadrats (GIND-05, GIND-44, GIND-53, GIND-55, GIND-75, GIND-91, GIND-94, WIND01, WIND06, WIND17, WIND20)<br><br>**Average Native Perennial Taxon Richness per Quadrat:** 18 ± 3<br><br>**Indicator Taxa:** No statistically significant indicator taxa<br><br>**Significant Taxa:** *Calotis* sp. Perrinvale Station (R.J. Cranfield 7096) (P3), *Drummondita fulva* (P3), *Micromyrtus trudgenii* (P3), *Polianthion collinum* (P3), *Rhodanthe collina* (P3)<br><br>**Variation:** This VU was generally structurally and compositionally uniform |  <br>**Plate 61: Typical VU 24 (Quadrat GIND-55)** |

| VU | Summary from Quadrat Data | Representative VU Photograph |
|---|---|---|
| | | |
| 25 | **Description:** Tall open shrubland of mixed species dominated by *Acacia assimilis* subsp. *assimilis* and occasionally *Acacia aneura* spp. and *Acacia latior* over mid shrubland to open shrubland dominated by *Hibbertia arcuata*, *Eremophila latrobei subsp. latrobei*, *Philotheca sericea* and *Aluta aspera subsp. hesperia* over low sparse shrubland of mixed species including *Xanthosia kochii* and *Prostanthera magnifica* over an occasional mid to low sparse forbland of mixed species including *Dianella revoluta* var. *divaricata* on red brown or brown silty clay loam with ironstone stones on lower slopes and mid slopes<br><br>**Area mapped (proportion of Study Area):** 286 ha (1.4 %)<br><br>**Sampling:** 8 quadrats (GIND-23, GIND-30, GIND-31, GIND-39, GIND-42, KARA06, KIOP 002, WIND07)<br><br>**Average Native Perennial Taxon Richness per Quadrat:** 17 ± 4<br><br>**Indicator Taxa:** *Hibbertia arcuata*<br><br>**Significant Taxa:** *Drummondita fulva* (P3), *Micromyrtus trudgenii* (P3)<br><br>**Variation:** A small number of quadrats in this VU contained isolated clumps of trees of *Eucalyptus leptopoda* subsp. *arctata* indicating the presence of a deeper soil profile in these areas. These quadrats also typically had slightly higher species richness and vegetation cover than the remaining quadrats (Plate 63). Quadrat KIOP 002 was located in an area with lighter coloured soils than usual for this VU, possibly indicating a slightly different underlying geology than the typical VU 25 |  <br>**Plate 62: Typical VU 25 (Quadrat GIND-30)** |

| VU | Summary from Quadrat Data | Representative VU Photograph |
|---|---|---|
| | | |
| 26 | **Description:** Mid shrubland to open shrubland of mixed species dominated by *Aluta aspera* subsp. *hesperia* and *Philotheca sericea* and occasionally *Acacia assimilis* subsp. *assimilis*, *Micromyrtus trudgenii* and *Eremophila latrobei* subsp. *latrobei* over low sparse shrubland of mixed species including *Leucopogon* sp. Clyde Hill (M.A. Burgman 1207) and *Xanthosia kochii* on red-brown or brown-red silty clay loam with ironstone rocks on lower slopes and mid slopes<br><br>**Area mapped (proportion of Study Area):** 271 ha (1.3 %)<br><br>**Sampling:** 7 quadrats (GIND-07, GIND-22, GIND-29, GIND-41, GIND-47, KIOP 028, WIND11)<br><br>**Average Native Perennial Taxon Richness per Quadrat:** 10 ± 4<br><br>**Indicator Taxa:** *Aluta aspera* subsp. *hesperia*<br><br>**Significant Taxa:** *Micromyrtus trudgenii* (P3)^, *Polianthion collinum* (P3)^<br><br>**Variation:** This VU exhibited some structural variation, with a small number of quadrats possessing a tall sparse shrubland stratum of mixed species including *Acacia aneura* spp., *Acacia umbraculiformis* and *Grevillea obliquistigma* subsp. *obliquistigma* (Plate 65) |  <br>**Plate 64: Typical VU 26 (Quadrat GIND-07)** |

| VU | Summary from Quadrat Data | Representative VU Photograph |
|---|---|---|
| | | |
| 27 | **Description:** Tall open shrubland to sparse shrubland of mixed species including *Melaleuca nematophylla*, *Acacia latior*, *Acacia ramulosa* var. *ramulosa* and *Calycopeplus paucifolius* over mid open shrubland to sparse shrubland of mixed species dominated by *Aluta aspera* subsp. *hesperia* and *Eremophila clarkei* and occasionally *Eremophila forrestii* subsp. *forrestii* and *Eremophila latrobei* subsp. *latrobei* over low sparse shrubland of mixed species including *Philotheca brucei* subsp. *brucei*, *Sida* sp. dark green fruits (S. van Leeuwen 2260) and *Philotheca deserti* subsp. *deserti* on red-brown or brown silty clay loam and sandy clay with ironstone, laterite and quartz gravel and stones on plains, lower slopes and mid slopes<br><br>**Area mapped (proportion of Study Area):** 219 ha (1.1 %)<br><br>**Sampling:** 7 quadrats (GIND-18, GIND-50, GIND-72, GINM-06, KIOP 007, KMLL01, KMLL02)<br><br>**Average Native Perennial Taxon Richness per Quadrat:** 13 ± 3<br><br>**Indicator Taxa:** No statistically significant indicator taxa<br><br>**Significant Taxa:** *Prostanthera* sp. Karara (D. Coultas & K. Greenacre Opp 8) (P1)^<br><br>**Variation:** This VU exhibited some structural and compositional variation across the Study Area. One quadrat (GIND-18) contained isolated clumps of trees of *Eucalyptus loxophleba* subsp. *supralaevis*, which is typically found lower in the landscape on deeper silty clay soils. In addition, quadrats GIND-72 and GINM-06 exhibited minor compositional variations likely due to being located on outwash areas, containing taxa including *Acacia umbraculiformis*, *Thryptomene costata* and *Borya sphaerocephala* that were absent from most other VU 27 quadrats |  <br>**Plate 66: Typical VU 27 (Quadrat GIND-50)** |

| VU | Summary from Quadrat Data | Representative VU Photograph |
|---|---|---|
| | | |
| 28 | **Description:** Tall shrubland to open shrubland of mixed species dominated by *Allocasuarina acutivalvis* subsp. *prinsepiana* and *Melaleuca nematophylla* and occasionally *Calycopeplus paucifolius* and *Acacia latior* over mid shrubland to sparse shrubland of mixed species dominated by *Acacia assimilis* subsp. *assimilis* and occasionally *Aluta aspera* subsp. *hesperia*, *Grevillea paradoxa* and *Gastrolobium laytonii* over low sparse shrubland of mixed species including *Philotheca sericea* and *Xanthosia kochii* on red or red-brown silty clay loam and sandy clay with ironstone, BIF and granite stones and occasionally with ironstone, BIF and granite outcropping on lower to upper slopes<br><br>**Area mapped (proportion of Study Area):** 307 ha (1.5 %)<br><br>**Sampling:** 13 quadrats (GIND-16, GIND-17, GIND-20, GIND-40, KARA04, KARA13, KARA14, KARA19, KIOP 479, KIOP 481, KIOP 482, KK05, WIND03)<br><br>**Average Native Perennial Taxon Richness per Quadrat:** 13 ± 5<br><br>**Indicator Taxa:** *Acacia assimilis* subsp. *assimilis*, *Allocasuarina acutivalvis* subsp. *prinsepiana*, *Grevillea paradoxa*<br><br>**Significant Taxa:** *Acacia karina* (P1)^, *Acacia woodmaniorum* (T)^, *Calotis* sp. Perrinvale Station (R.J. Cranfield 7096) (P3), *Lepidosperma* sp. Blue Hills (A. Markey & S. Dillon 3468) (P1)^, *Micromyrtus trudgenii* (P3), *Millotia dimorpha* (P1)^, *Rhodanthe collina* (P3)<br><br>**Variation:** This VU exhibited some compositional variation between the two occurrences on Mount Karara and Mungada Ridge. Quadrats located on Mungada Ridge contained taxa more strongly associated with BIF, including the significant taxa *Acacia woodmaniorum* (T) and *Micromyrtus trudgenii* (P3), which were absent from the Mount Karara quadrats. A number of these quadrats also contained *Acacia aneura* |  <br>Plate 67: Typical VU 28 (Quadrat GIND-16) |

# Appendix E. Sources of information

## E.1. GIS databases

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

- 10 Metre Contours (DPIRD-073)
- 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)
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- 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)

### E.2. References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Bamford Consulting Ecologists (2009) Rail Loop and Associated Infrastructure Project. Prepared on behalf of KML.

Bancroft, W. J., Huang, N. and Bamford, M. J. (2012). Karara Iron Ore Project: Annual Monitoring Survey of the Shield-backed Trapdoor Spider 2010 to 2011. Unpublished report to Karara.

Mining Limited by M. J. and A. R. Bamford Consulting Ecologists, Kingsley, Western Australia.

Biologic Environmental Survey (November 2008) Level 1 Fauna Survey – Karara to Tilley Rail Project.

BoM (2025) Bureau of Meteorology Website – Climate Data Online, Laverton Aero. Bureau of Meteorology. http://www.bom.gov.au/climate/data/ (Accessed 02 January 2025).

Coffey Natural Systems (2008) Mungada Iron Ore Project, Project Summary. Coffey Natural Systems, July 2008.

Commonwealth of Australia (2001) *National Objectives and Targets for Biodiversity Conservation 2001-2005*, Canberra.

Department of Planning, Lands and Heritage (DPLH) (2025) Aboriginal Heritage Inquiry System. Department of Planning, Lands and Heritage. https://espatial.dplh.wa.gov.au/AHIS/index.html?viewer=AHIS (22 Febuary 2025).

Department of Primary Industries and Regional Development (DPIRD) (2025) NRInfo Digital Mapping. Department of Primary Industries and Regional Development. Government of Western Australia. URL: https://maps.agric.wa.gov.au/nrm-info/ (Accessed 30 January 2025).

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

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Huang, N. and Bamford, M. J. (2011b). Review of distribution and abundance of the Shield-backed Trapdoor Spider in the Karara Iron Ore Project Area. Unpublished report to Karara Mining Limited by M. J. and A. R. Bamford Consulting Ecologists, Kingsley, Western Australia.

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Woodman Environmental Consulting (2021) Karara Project expansion, Detailed and Targeted Flora and Vegetation Assessment, Unpublished report for Karara Mining Ltd, November 2021.

Woodman Environmental Consulting (2012) Vegetation Survey of the Karara to Minjar Block. Unpublished report for Karara Mining Ltd, July 2009.

Woodman Environmental Consulting (2009) Flora and Vegetation Survey of the Railway Corridor and Associated Borrow Pits (Karara to Tilley Siding). Unpublished report for Karara Mining Ltd, July 2009.


## 4. Glossary

### Acronyms:

| | |
|---|---|
| **BC Act** | *Biodiversity Conservation Act 2016,* Western Australia |
| **BoM** | Bureau of Meteorology, Australian Government |
| **DAA** | Department of Aboriginal Affairs, Western Australia (now DPLH) |
| **DAFWA** | Department of Agriculture and Food, Western Australia (now DPIRD) |
| **DAWE** | Department of Agriculture, Water and the Environment, Australian Government |
| **DBCA** | Department of Biodiversity, Conservation and Attractions, Western Australia |
| **DER** | Department of Environment Regulation, Western Australia (now DWER) |
| **DEMIRS** | Department of Energy, Mines, Industry Regulation and Safety, Western Australia |
| **DMP** | Department of Mines and Petroleum, Western Australia (now DEMIRS) |
| **DoEE** | Department of the Environment and Energy (now DAWE) |
| **DoW** | Department of Water, Western Australia (now DWER) |
| **DPaW** | Department of Parks and Wildlife, Western Australia (now DBCA) |
| **DPIRD** | Department of Primary Industries and Regional Development, Western Australia |
| **DPLH** | Department of Planning, Lands and Heritage, Western Australia |
| **DRF** | Declared Rare Flora (now known as Threatened Flora) |
| **DWER** | Department of Water and Environmental Regulation, Western Australia |
| **EP Act** | *Environmental Protection Act 1986*, Western Australia |

| | |
|---|---|
| **EPA** | Environmental Protection Authority, Western Australia |
| **EPBC Act** | *Environment Protection and Biodiversity Conservation Act 1999* (Federal Act) |
| **GIS** | Geographical Information System |
| **ha** | Hectare (10,000 square metres) |
| **IBRA** | Interim Biogeographic Regionalisation for Australia |
| **IUCN** | International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union |
| **PEC** | Priority Ecological Community, Western Australia |
| **RIWI Act** | *Rights in Water and Irrigation Act 1914*, Western Australia |
| **TEC** | 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.