



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 8862/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Calidus Resources Limited

1.3. Property details

Property: Miscellaneous Licence 45/523
Local Government Area: Shire of East Pilbara
Colloquial name: Warrawoona Gold Project

1.4. Application

| Clearing Area (ha) | No. Trees | Method of Clearing | For the purpose of: |
|--------------------|-----------|--------------------|---|
| 25.8 | | Mechanical Removal | Accommodation Camp, Access Road and Associated Activities |

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 30 July 2020

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

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

A flora and vegetation survey was conducted over the application area and surrounds by Woodman Environmental (Woodman) during April 2018. The following vegetation associations were recorded within part of the application area (Woodman, 2018; Woodman, 2019):

1: Mid sparse shrubland dominated by *Acacia* and/or *Grevillea* species over low sparse shrubland of mixed species over low closed to low hummock grassland of *Triodia epactia* on red-brown sandy clay loam to clayey sand with occasional granite outcropping, on stoney plains, outwashes and low hills;

3: Low open woodland dominated by *Corymbia hamersleyana* with occasional *Eucalyptus victrix* over tall to sparse shrubland of mixed species including *Acacia bivenosa*, *Acacia pyrifolia* var. *pyrifolia* and *Acacia trachycarpa* over low sparse shrubland of mixed species including *Corchorus laniflorus* and *Corchorus parviflorus* over mid to low closed to open hummock grassland of mixed *Triodia* species over mid to low grassland to sparse grassland of mixed species including *Cenchrus ciliaris* and *Cymbopogon ambiguous* and herbs on red to brown clay loams to sandy loams in minor to medium drainage lines and outwash flood plains with occasional granite outcropping;

4: Low isolated clumps of trees of *Corymbia hamersleyana* over mid to tall open to sparse shrubland of mixed species including *Acacia eriopoda* and *Acacia inaequilatera* over low sparse shrubland of mixed species including *Bonamia erecta*, *Corchorus parviflorus*, *Indigofera monophylla* and *Ptilotus astrolasius* over low closed to low hummock grassland dominated by *Triodia epactia* on red to brown clay-sand to sandy clay loam with occasional granite outcropping, on outwash flood plains;

5: Tall sparse shrubland of *Acacia inaequilatera* over low isolated shrubs of mixed taxa including *Corchorus parviflorus* over low hummock grassland to closed hummock grassland of *Triodia wiseana* on low rises to mid slopes on stony brown sandy clay loam with calcrete or granite outcropping; and

7: Occasional tall isolated clumps of shrubs of *Acacia orthocarpa* or *Acacia inaequilatera* over low isolated shrubs of *Indigofera monophylla* over mid closed hummock grassland of *Triodia wiseana* on stony hills on red-brown sandy clay loam with dolerite outcropping.

Clearing Description

Warrawoona Gold Project.
Calidus Resources Limited proposes to clear up to 25.8 hectares of native vegetation within a boundary of approximately 25.8 hectares, for the purpose of an accommodation camp, access road and associated activities. The project is located approximately 21 kilometres south-east of Marble Bar, within the Shire of East Pilbara.

Vegetation Condition Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994).

to

Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery, 1994).

Comment The vegetation condition was derived from a vegetation survey conducted by Woodman (2018).

The proposed clearing is for the construction of a new accommodation camp, road to the accommodation village, borrow pits for the road, laydown area to for construction infrastructure, facilities and equipment, and a utilities corridor for the Warrawoona Gold Project.

3. Assessment of application against Clearing Principles

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

Comments **Proposal is not likely to be at variance to this Principle**

The clearing permit application area is located within the Chichester subregion of the Interim Biogeographic Regionalisation for Australia (IBRA) Pilbara Bioregion (GIS Database). The Chichester subregion is characterised by undulating Archaean granite, basalt plains and basaltic ranges. Plains support shrub steppe characterised by *Acacia inaequilatera* over *Triodia wiseana* hummock grasslands, while ranges support *Eucalyptus leucophloia* (CALM, 2002).

A flora and vegetation assessment of part of the application area and surrounds was conducted by Woodman Environmental during 10-15 April 2018 (Woodman, 2018). The vegetation of the application area was dominated by *Acacia* shrubland and *Triodia* hummock grasslands (Woodman, 2018; Woodman, 2019). No Threatened or Priority Ecological Communities were identified as potentially occurring in the application area and the field assessment of part of the application did not record any (GIS Database; Woodman, 2018; Woodman, 2019).

A total of 266 flora taxa from 122 genera and 45 families were recorded within the application area and surrounds during the field assessment (Woodman, 2018). Five conservation significant flora species may potentially occur within the application area based on suitable habitat, including one potentially undescribed flora species (Woodman, 2018; Calidus, 2020). One Priority flora species, *Heliotropium murinum* (P3), occurs at three locations within the application area and will be impacted by the proposed clearing (Calidus, 2020). *Heliotropium murinum* is relatively common and widespread throughout the region, therefore the proposed clearing is unlikely to impact this species at the local or regional scale (Woodman, 2019; EPA, 2020). No other Priority flora species were recorded within the application during the field assessment, and no Threatened flora were determined to be potentially occurring within the application area and none were recorded during the field assessment (Woodman, 2018; Woodman, 2019; Calidus, 2020).

No introduced flora taxa were recorded within the application area, however 11 introduced flora taxa were recorded within the greater Warrawoona Gold Project area, with declared pest species *Calotropis procera* recorded within close proximity to the application area (Woodman, 2019). Weeds have the potential to out-compete native flora and reduce the biodiversity of an area. A weed management condition may minimise the potential for the proposed clearing to introduce or spread weeds to non-infested areas.

A desktop assessment of available databases and literature review identified a total of 319 species of vertebrate fauna that have previously been recorded and/or have the potential to occur within the application area and surrounds (Biologic, 2017). The desktop assessment identified 13 conservation significant species that may potentially occur within the application area based on suitable habitat present (Biologic, 2017). No conservation significant fauna were recorded within the application area, however six species were recorded within the surrounds (Biologic, 2017). Conservation significant species that are most likely to utilise the fauna habitats within the application area were not recorded during any of the fauna assessments (Biologic, 2017; Biologic, 2019a; Biologic, 2019b; Biologic, 2019c; Biologic, 2019d). Fauna habitats identified during the field assessment are fairly common and widespread throughout the region, and extend beyond the application area (Biologic, 2017). The EPA (2020) determined that the proposed clearing is unlikely to significantly impact any conservation significant fauna that may potentially occur within the application area.

The vegetation associations, fauna habitats and landform types present within the application area are relatively well represented in surrounding areas (Woodman, 2018; Biologic, 2017; GIS Database). The application area is unlikely to represent an area of higher biodiversity than surrounding areas, in either a local or regional context.

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

Methodology Biologic (2017)
Biologic (2019a)
Biologic (2019b)
Biologic (2019c)

Biologic (2019d)
Calidus (2020)
CALM (2002)
EPA (2020)
Woodman (2018)
Woodman (2019)

GIS Database:

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

(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Comments

Proposal is not likely to be at variance to this Principle

Multiple fauna assessments have been conducted across the application area and surrounds (Biologic, 2017; Biologic, 2019b; Biologic, 2019c; Biologic, 2019d). A level 1 fauna assessment was conducted within the application area and surrounds by Biologic Environmental Survey (Biologic) on 20-24 September 2017. The following five broad fauna habitats have been recorded within the application area (Biologic, 2017):

Sandplain: deep sandy soils supporting dense spinifex grasslands and sparse low shrubs;

Minor drainage line: dense stands of shrubs, often *Acacia* species and *Petalostylis* species, the understorey generally comprised tussock grasses including Buffel Grass;

Stony plain: scattered *Acacia* and small shrubs over dense spinifex hummock grasslands on red stony clay soil with some exposed outcrops;

Rounded hills: undulating rounded hills and gentle to steep slopes rising occasionally to isolated areas of Rocky outcrop, as well as shallow/ open gullies leading to drainage; and

Medium drainage line: large drainage channels lined with large *Eucalyptus* trees, the main drainage channel is often devoid of vegetation or dense Buffel Grasslands.

The condition of the fauna habitats within the application area ranged from excellent to pristine (Biologic, 2017). All fauna habitats are considered common throughout the region, with drainage lines being less common, however all habitats are represented outside the application area (Biologic, 2017). The sandplain habitat is considered to be of high significance due to the ability to provide crucial habitat for species of conservation significance, while the remaining four are considered to be of moderate significance (Biologic, 2017). The majority of the application area consists of the sandplain and stony plain habitats (Biologic, 2017).

A desktop assessment identified 29 conservation significant fauna species that have previously been recorded and/or have the potential to occur within a 40 kilometre radius of the application area (Biologic, 2017). 13 of the 29 fauna species may potentially occur within the application area due to the presence of suitable habitat (Biologic, 2017).

No conservation significant fauna were recorded within the application area during any of the surveys, however six fauna species have been recorded within the broader proposed Warrawoona Gold Project area (Biologic, 2019a). The following six conservation significant fauna species are: Northern Quoll (*Dasyurus hallucatus*, EN at a state and federal level), Western Pebble-mound Mouse (*Pseudomys chapmani*, P4), Brush-tailed Mulgara (*Dasyercus blythi*, P4), Pilbara Olive Python (*Liasis olivaceus barroni*, VU at a state and federal level), Ghost Bat (*Macroderma gigas*, VU at a state and federal level), and Pilbara Leaf-Nosed Bat (*Rhinioncteris aurantia*, VU at a state and federal level).

The stony plain habitat type is the preferred habitat for the Western Pebble-mound Mouse, however all mounds for this species were recorded outside the application area (Biologic, 2017). This species has a small core home range and does not use secondary mounds, occupying resource rich niches (Biologic, 2019a). The proposed clearing is unlikely to have a significant impact to the local population. The Stony Plain habitat is one of the most common habitat types within the Pilbara bioregion (Biologic, 2017). The proposed clearing of suitable habitat is for the purpose of constructing a road, which is unlikely to create a dispersal barrier (Biologic, 2019a).

Brush-tailed Mulgara were recorded on motion camera just outside the application area in April 2019, in sandplain habitat (Biologic, 2019b). Brush-tailed Mulgara are known for using multiple burrow systems within a home-range and change these frequently (Biologic, 2019b). Sandplain habitat is a reasonably common habitat type within the Chichester subregion, and extends beyond the application area (Biologic, 2017). The proposed clearing is unlikely to significantly impact the conservation status of Brush-tailed Mulgara.

The remaining four recorded species are likely to only utilise the drainage line habitats for foraging or dispersal (Biologic, 2017; Biologic, 2019a; Biologic, 2019c; Biologic, 2019d). These habitats make up a small percentage of the application area and none of these species are dependent on drainage line habitats (Biologic, 2017), therefore the proposed clearing is unlikely to cause a significant impact to the conservation status of these species.

Other conservation significant species that are considered likely to occur within the application area due to suitable habitat are the Greater Bilby (*Macrotis lagotis*, VU at a state and federal level) and the Spectacled Hare-wallaby (*Lagorchestes conspicillatus leichardti*, P3) (Biologic, 2017). The western end of the application area is considered to be high quality Greater Bilby habitat, as their preferred habitat is sandplain and potentially stony plain (EPA, 2020). Biologic (2019b) conducted a targeted Greater Bilby survey and recorded no presence of the Greater Bilby within the application area. The closest and most recent record is 15 kilometres east of the application area, recorded in 2004 (Biologic, 2019b). Sandplain is a reasonably common habitat type within the Pilbara subregion and extends beyond the application area (Biologic, 2017). The EPA (2020) has determined that the proposed clearing of up to 11.1 hectares of potential habitat for the Warrawoona Gold Project is unlikely to cause a significant impact to the Greater Bilby.

There are no records of the Spectacled Hare-wallaby within the application area, and the proposed clearing is unlikely to cause significant loss of core habitat for this species (Biologic, 2019a). The Spectacled Hare-wallaby has high dispersal capabilities, and there is connectivity to similar ideal habitat beyond the application area (Biologic, 2019a). The Peregrine Falcon is also considered likely to occur within the application area, however is a highly mobile species and therefore unlikely to rely on the application area for nesting or foraging (Biologic, 2019a).

Other possibly occurring conservation significant species within the application area are the Grey Flacon (*Falco hypoleucos*, VU at a state level), Long-tailed Dunnart (*Sminthopsis longicaudata*, P4), and the Northern Brushtail Possum (*Trichosurus vulpecula arnhemensis*, VU at a state level) (Biologic, 2017). Whilst there is some ideal habitat within the application area for foraging, none of these species have been recorded locally despite multiple fauna surveys, and are therefore not likely to be impacted by the proposed clearing (Biologic, 2019a).

The fauna habitat types identified within the application area fairly common throughout the Pilbara bioregion. Impacts to fauna habitats from the proposed clearing is considered to be minimal, there is habitat connectivity beyond the application area and none of the habitat types are restricted to the application area (Biologic, 2019a).

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

Methodology Biologic (2017)
Biologic (2019a)
Biologic (2019b)
Biologic (2019c)
Biologic (2019d)
EPA (2020)

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

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

Comments Proposal is not likely to be at variance to this Principle

There are no known records of Threatened flora within the application area (GIS Database). Flora surveys of the application area did not record any species of Threatened flora (Calidus, 2020; Woodman, 2018; Woodman, 2019).

None of the vegetation types within the application area are known habitat for any species of Threatened flora. The vegetation proposed to be cleared is unlikely to be necessary for the continued existence of any species of Threatened (rare) flora (GIS Database; Woodman, 2018; Woodman, 2019).

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

Methodology Calidus (2020)
Woodman (2018)
Woodman (2019)

GIS Database:
 - Pre-European Vegetation
 - Threatened and Priority Flora

(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Comments Proposal is not likely to be at variance to this Principle

There are no known Threatened Ecological Communities (TECs) located within or in close proximity to the application area (GIS Database).

A flora and vegetation survey of the application area did not identify any TECs (Calidus, 2020; Woodman, 2018; Woodman, 2019).

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

Methodology Calidus (2020)
 Woodman (2018)
 Woodman (2019)

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

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Comments Proposal is not at variance to this Principle

The application area falls within the Pilbara Bioregion of the Interim Biogeographic Regionalisation for Australia (IBRA) (GIS Database). Approximately 99% of the pre-European vegetation still exists in the IBRA Pilbara Bioregion (Government of Western Australia, 2019). The application area is broadly mapped as Beard vegetation associations 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana*; and 93: Hummock grasslands, shrub steppe; kanji over soft spinifex (GIS Database). Approximately 99% of the pre-European extent of each of these vegetation associations remains uncleared at both the state and bioregional level (Government of Western Australia, 2019).

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

| | Pre-European area (ha)* | Current extent (ha)* | Remaining %* | Conservation Status** | Pre-European % in DBCA managed lands |
|---|-------------------------|----------------------|--------------|-----------------------|--------------------------------------|
| IBRA Bioregion – Pilbara | 17,808,657 | 17,731,764 | ~99 | Least Concern | 10.12 |
| Beard vegetation associations – WA | | | | | |
| 82 | 2,565,901 | 2,553,206 | ~99 | Least Concern | 11.51 |
| 93 | 3,044,309 | 3,040,640 | ~99 | Least Concern | 1.96 |
| Beard vegetation associations – Pilbara Bioregion | | | | | |
| 82 | 2,563,583 | 2,550,888 | ~99 | Least Concern | 11.52 |
| 93 | 3,042,114 | 3,038,471 | ~99 | Least Concern | 1.96 |

* Government of Western Australia (2019)

** Department of Natural Resources and Environment (2002)

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

Methodology Department of Natural Resources and Environment (2002)
 Government of Western Australia (2019)

GIS Database:
 - IBRA Australia
 - Pre-European Vegetation

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Comments Proposal is at variance to this Principle

There are no permanent watercourses or wetlands within the area proposed to clear (GIS Database). Multiple non-perennial drainage lines pass through the application area (GIS Database).

Drainage lines in the region are dry for most of the year, only flowing briefly immediately following significant rainfall (GRM, 2019). However, vegetation type 3 is growing in association with these drainage lines (Woodman, 2018).

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

Methodology GRM (2019)
Woodman (2018)

GIS Database:
- Hydrography, Lakes
- Hydrography, linear

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Comments Proposal is not likely to be at variance to this Principle

The application area lies within the Macroy and Rocklea land systems (Calidus, 2020). These land systems have been mapped and described in technical bulletins produced by the former Department of Agriculture (now the Department of Primary Industries and Regional Development).

The Macroy land system is described as stony plains and occasional tor fields based on granite supporting hard and soft spinifex grasslands (Van Vreeswyk et al., 2004). Soils within this system are not likely to erode (Van Vreeswyk et al., 2004).

The Rocklea land system consists of basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex (and occasionally soft spinifex) grasslands (Van Vreeswyk et al., 2004). This land system has very low erosion hazard (Van Vreeswyk et al., 2004).

Given the size of the application area (25.8 hectares) and the low erosion potential of both land systems present, the proposed clearing is unlikely to cause appreciable land degradation.

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

Methodology Calidus (2020)
Van Vreeswyk et al. (2004)

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Comments Proposal is not likely to be at variance to this Principle

There are no conservation areas in the vicinity of the application area. The nearest DBCA (formerly DPaW) managed land is the former Meentheena Pastoral Lease which is located approximately 30 kilometres east of the application area (GIS Database). The proposed clearing is unlikely to impact on the environmental values of any conservation area.

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

Methodology GIS Database:
- DPaW Tenure

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

Comments Proposal is not likely to be at variance to this Principle

There are no Public Drinking Water Source Areas (PDWSA) within or in close proximity to the application area (GIS Database). The closest PDWSA is the Marble Bar Water Reserve, approximately 20 kilometres northwest of the application area (GIS Database). There are no permanent watercourses or wetlands within the area proposed to clear (GIS Database). Drainage lines in the region are dry for most of the year, only flowing briefly immediately following significant rainfall (GRM, 2019). The proposed clearing is unlikely to result in significant changes to surface water flows.

The groundwater within the application area is between 500 – 1,000 milligrams per litre of Total Dissolved

Solids (TDS) (GIS Database). The proposed clearing is unlikely to cause deterioration to ground water.

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

Methodology GRM (2019)

GIS Database:

- Groundwater Salinity, Statewide
- Hydrography, Linear
- Public Drinking Water Source Areas

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Comments **Proposal is not likely to be at variance to this Principle**

The climate of the Pilbara bioregion is semi-arid, with a low average rainfall of approximately 364.6 millimetres per year (BoM, 2020). Drainage lines in the area are dry for most of the year, only flowing briefly immediately following significant rainfall in the summer months (January to March) (Calidus, 2020; GRM, 2019).

There are no permanent water courses or waterbodies within the application area (GIS Database). Seasonal drainage lines are common in the region and temporary localised flooding may occur briefly following heavy rainfall events (GRM, 2019). However, the proposed clearing is unlikely to increase the incidence or intensity of natural flooding events.

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

Methodology BoM (2020)
Calidus (2020)
GRM (2019)

GIS Database:

- Hydrographic Catchments - Catchments
- Hydrography, linear

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

Comments

The clearing permit application was advertised on 20 April 2020 by the Department of Mines, Industry Regulation and Safety (DMIRS), inviting submissions from the public. No submissions were received in relation to this application.

The proposed clearing is for the construction of an accommodation village, roads, borrow pits, laydown area for construction infrastructure, facilities and equipment, and a utilities corridor associated with the implementation of the larger Warrawoona Gold Project. The Warrawoona Gold Project is under formal assessment under Part IV of the *Environmental Protection Act 1986* (EP Act) by the Environmental Protection Authority (EPA). On 22 July 2020 the EPA confirmed that the works subject of this native vegetation clearing permit application are Minor and Preliminary, and DMIRS is not constrained from making a decision under section 51F of the EP Act.

There are two native title claims (WC1999/008; WC2018/022) over the area under application (DPLH, 2020). These claims have been registered with the National Native Title Tribunal and determined by the Federal Court respectively, on behalf of the claimant groups. However, the mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are no registered Aboriginal Sites of Significance within the application area (DPLH, 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.

Methodology DPLH (2020)

4. References

- Biologic (2017) Warrawoona Gold Project: Level 1 Vertebrate Fauna Survey, and Desktop SRE and Subterranean Assessment. Prepared by Biologic Environmental Survey Pty Ltd, for Calidus Resources Limited, December 2017.
- Biologic (2019a) Warrawoona Gold Project: Conservation Significant Vertebrate Fauna Impact Assessment. Prepared by Biologic Environmental Survey Pty Ltd, for Calidus Resources Limited, October 2019.
- Biologic (2019b) Warrawoona Gold Project: 2019 Significant Species Survey. Prepared by Biologic Environmental Survey Pty Ltd, for Calidus Resources Limited, June 2017.
- Biologic (2019c) Warrawoona Gold Project: 2019 VHF Bat Foraging Studies. Prepared by Biologic Environmental Survey Pty Ltd, for Calidus Resources Limited, September 2019.
- Biologic (2019d) Warrawoona Targeted Bat Assessment – April 2019. Prepared by Biologic Environmental Survey Pty Ltd, for Calidus Resources Limited, August 2019.
- BoM (2020) Bureau of Meteorology Website – Climate Data Online, 004106 Marble Bar. Bureau of Meteorology. <http://www.bom.gov.au/climate/data/> (Accessed 22 July 2020).
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002. Department of Conservation and Land Management, Western Australia.
- Calidus (2020) Warrawoona Gold Project: Early Works Program. NVCP Application, Supplementary Information Report. Prepared by Calidus Resources Limited, March 2020.
- DPLH (2020) Aboriginal Heritage Inquiry System. Department of Planning, Lands and Heritage. <http://maps.daa.wa.gov.au/AHIS/> (Accessed 22 July 2020).
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- EPA (2020) Report and recommendations of the Environmental Protection Authority. Warrawoona Gold Project, Calidus Resources Limited, June 2020.
- Government of Western Australia (2019) 2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019. WA Department of Biodiversity, Conservation and Attractions, Perth. <https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics>
- GRM (2019) Hydro-Meteorological and Surface Water Management Study. Warrawoona Gold Project. Pre-Feasibility Study. Prepared by Groundwater Resource Management, for Calidus Resources Limited, May 2019.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Van Vreeswyk, A.M.E., Payne, A.L., Leighton, K.A. and Hennig, P. (2004) An inventory and condition survey of the Pilbara Region, Western Australia. Technical Bulletin No. 92. Department of Agriculture, South Perth, Western Australia.
- Woodman (2018) Warrawoona Gold Project Flora and Vegetation Survey. Report prepared by Woodman Environmental, for Calidus Resources Limited, October 2018.
- Woodman (2019) Memo of recommendations for referral of Warrawoona Gold Project, assessment against Clearing Principles. Report prepared by Woodman Environmental, for Calidus Resources Limited, September 2019.

5. Glossary

Acronyms:

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

| | |
|----------|--|
| PEC | Priority Ecological Community, Western Australia |
| RIWI Act | <i>Rights in Water and Irrigation Act 1914</i> , Western Australia |
| TEC | Threatened Ecological Community |

Definitions:

{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.