Government of Western Australia
Department of Mines, Industry Regulation and Safety

Clearing Permit Decision Report

1. Application details and outcomes

1.1. Permit application details

Permit number:	9829/1
Permit type:	Purpose Permit
Applicant name:	Whim Creek Metals Pty Ltd
Application received:	1 August 2022
Application area:	35 hectares
Purpose of clearing:	Purpose as shown on Permit
Method of clearing:	Mechanical Removal
Tenure:	Mining Leases 47/443 and 47/236
Location (LGA area/s):	City of Karratha
Colloquial name:	Whim Creek Copper-Zinc Project

1.2. Description of clearing activities

Whim Creek Metals Pty Ltd proposes to clear up to 35 hectares of native vegetation within a boundary of approximately 82.544 hectares, for the purpose of mining related infrastructure. The project is located approximately 98 kilometres south-west of Port Hedland, within the Shire of Karratha.

The application is to allow for recommencement of operations at the Whim Creek Project.

1.3. Decision on application and key considerations

Decision:	Grant
Decision date:	30 September 2022
Decision area:	35 hectares of native vegetation

1.4. Reasons for decision

This clearing permit application was made in accordance with section 51E of the *Environmental Protection Act 1986* (EP Act) and was received by the Department of Mines, Industry Regulation and Safety (DMIRS) on 1 August 2022. DMIRS advertised the application for a public comment for a period of 21 days, and one submission was received raising no objection.

In making this decision, the Delegated Officer had regard for the site characteristics (Appendix A), relevant datasets (Appendix D), the clearing principles set out in Schedule 5 of the EP Act (Appendix B), proposed avoidance and minimisation measures (Section 3.1), relevant planning instruments and any other matters considered relevant to the assessment (Section 3).

The assessment identified that:

- the clearing has the potential for the introduction and spread of weeds into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values;
- the clearing is not likely to have a significant impact on habitat for Priority flora species;
- the vegetation is not likely to represent significant habitat for fauna species; and
- the clearing will impact several minor ephemeral drainage lines however, it will not impact surface water flow at a broad level.

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

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

- avoid, minimise to reduce the impacts and extent of clearing;
- take hygiene steps to minimise the risk of the introduction and spread of weeds;
- vegetation management condition to minimise impacts to watercourses; and
- fauna management to minimise impacts to the northern quoll.

1.5. Site map

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

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

2. Legislative context

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

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

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

Other legislation of relevance for this assessment include:

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

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)

3. Detailed assessment of application

3.1. Avoidance and mitigation measures

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. Environmental management measures that will be implemented for the Whim Creek minesite include (ANAX, 2022):

- Ground Disturbance Permit procedures will be implemented prior to clearing;
- Areas designated for clearing will be surveyed and boundaries clearly demarcated. Operator personnel will be familiarised with demarcated areas prior to the commencement of clearing to ensure no clearing is undertaken beyond demarcated clearing zones;
- Areas designated for clearing will be surveyed and boundaries clearly demarcated. Operator personnel will be familiarised with demarcated areas prior to the commencement of clearing to ensure no clearing is undertaken beyond demarcated clearing zones;
- Existing access tracks or other cleared areas will be utilised to prevent unnecessary clearing;
- Clearing will be undertaken progressively so only those areas absolutely required for operations are disturbed; and
- Personnel will be inducted and educated on environmental requirements of the Project.

3.2. Assessment of impacts on environmental values

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

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

3.2.1. Biological values (flora) - Clearing Principle (a)

Assessment

Several flora and vegetation and vegetation health surveys have been conducted across the Whim Creek project area including surveys undertaken by Connell (2005), Astron (2006) and in 2007 by Onshore Environmental Consultants (Onshore). Vicki Long and Associates (VLA) (2021) has undertook a desktop review of flora and vegetation reports available.

A total of 130 flora species from 77 genera and 37 families were recorded within the application area (Astron, 2006). A desktop assessment identified nine flora species of conservation significance within 40 kilometres of the application area (VLA, 2021). Two species were considered likely to occur within the application area based on suitable habitat and proximity of nearby records: *Heliotropium muticum* (P3) and *Goodenia nuda* (P4) (VLA, 2021). An additional two flora species have the potential to occur within the application area based on suitable habitat: *Tephrosia rosea* var. Port Hedland (P1) and *Rhynchosia bungarensis* (P4) (VLA, 2021). The surveys conducted in 2005, 2006 and 2007did not identify any Threatened or Priority flora species within the application area (VLA, 2021; ANAX, 2022). Priority flora species potentially present are not locally or regionally restricted, and occur across multiple IBRA bioregions or subregions (Western Australian Herbarium, 1998-). Given the known records and distribution of these species the proposed clearing is unlikely to have a significant impact on the conservation status of Priority flora potentially present. It is noted that the application area has had significant historic disturbance (Figure 2) (GIS Database), and that the proposed clearing is for resumption of mining activities. There are rehabilitation and closure requirements associated with the mining proposal that are likely to return the application area into a better state than is currently present.

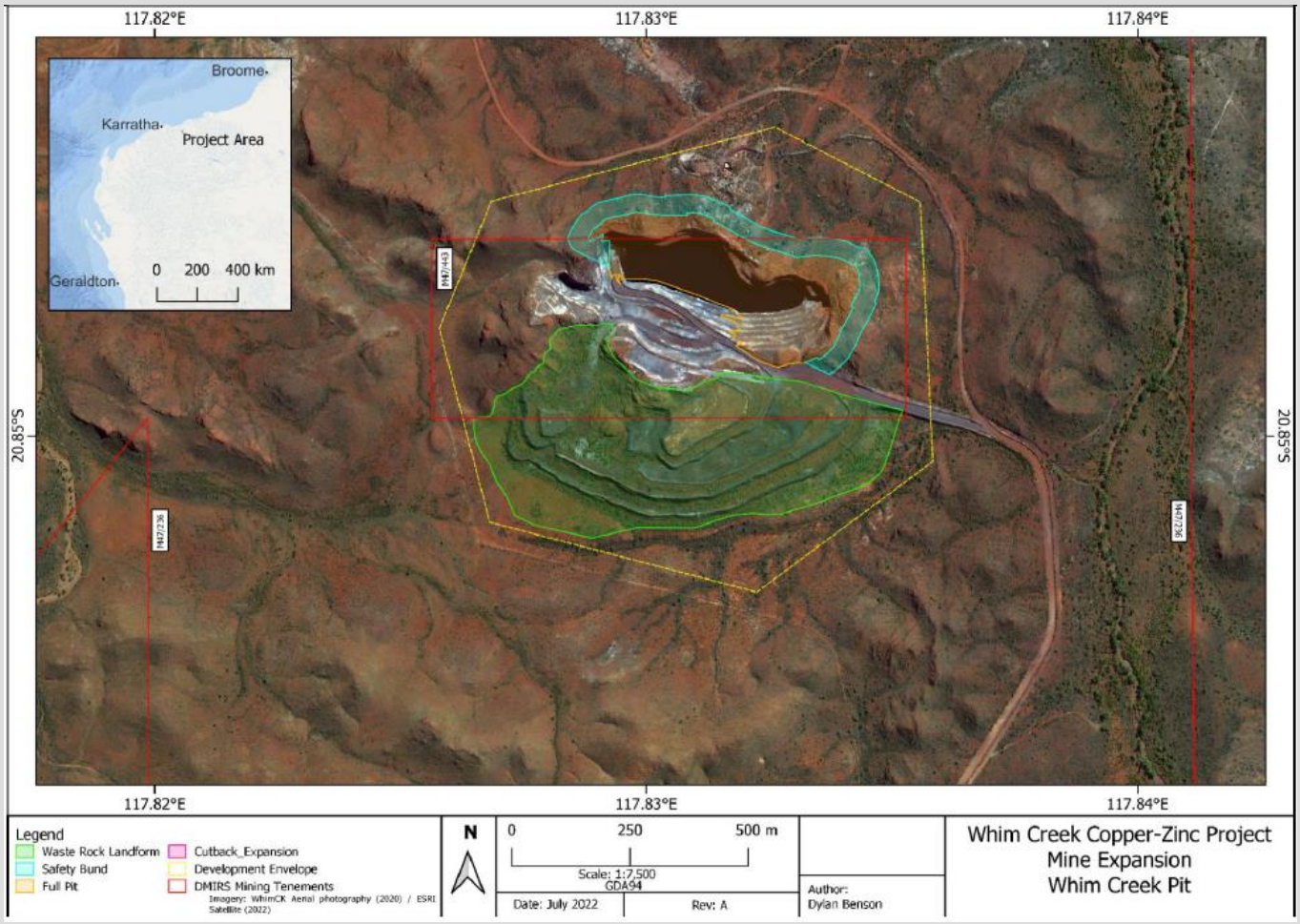

Figure 2. Previous disturbance.

Four species of weeds were recorded during the greater field survey of the application area and surrounding areas (ANAX, 2022). None were listed as a Declared Pest according to the *Biosecurity and Agriculture Management Act 2007* (ANAX, 2022). Weeds have the potential to out-compete native flora and reduce the biodiversity of an area. Potential impacts to biodiversity as a result of the introduction of weeds may be minimised by the implementation of a weed management condition.

Conclusion

For the reasons set out above, it is considered that the vegetation within the application area is not likely to represent an area of high diversity. The proposed clearing does have the potential to exacerbate the spread of weeds in the local area.

Conditions

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

- Take hygiene steps to minimise the risk of the introduction and spread of weeds.

3.2.2. Biological values (fauna) - Clearing Principles (a) and (b)

Assessment

The following five fauna habitats have been recorded within the application area and surrounds (Bamford, 2021):

- Rocky hills
- Gravelly hills
- Stony plains and lower slopes
- Sandy to sandy loam plains
- Drainage lines

The fauna habitats present within the application area and surrounds are considered to be extensive within the region and are not restricted to the application area (Bamford, 2021). The proposed development within application area will likely impact rocky hills, gravelly hills, and stony plains and lower slopes fauna habitats (Bamford, 2021).

Two conservation significant species were recorded within the application area and surrounds by secondary evidence (tracks) or on camera traps, including: northern quoll (*Dasyurus hallucatus*, EN at a state and federal level) and ghost bat (*Macroderma gigas*, VU at a state and federal level) (Bamford, 2021). Northern Quoll were recorded with camera traps at 14 locations within and outside the application area (only one record within the application area) (Bamford, 2021). One camera trap within the application area at Whim Creek minesite recorded Northern Quoll within close proximity to existing mining operations, such as open pits and waste rock landforms (Bamford, 2021). No Northern Quoll dens were identified in the Whim Creek minesite area during active searching (both within and outside of the development envelope) on both of the site visits, however the landforms

present within the application area (rocky ridges and hills) have the potential to provide denning habitat (Bamford, 2021). While suitable rocky denning habitat for Northern Quoll is quite extensive within the broader survey area (up to 8 kilometres from the application area) and within the region, the proposed clearing will potentially impact denning habitat (Bamford, 2021).

A ghost bat has been identified approximately five kilometres south of the application area, in a temporary roost at a mine adit located approximately 500 meters south of the Mons Cupri minesite, on the side of a hill facing away from the mining development and determined to be a regular visitor to the broader survey area (Bamford, 2021). There is no known roosting habitat present within the Whim Creek minesite application area (Bamford, 2021). The proposed clearing may impact potential foraging and dispersal habitat, however the impacts are not expected to significantly impact the conservation status of this species (Bamford, 2021).

Conclusion

Based on the above assessment, the proposed clearing may result in the reduction of habitat for the northern quoll. Whilst the proposed clearing may have potential impacts on fauna in the local area, these impacts can be management by the implementation of conditions on the permit to ensure that surveys are undertaken to determine the presence of the northern quoll and their dens, and to relocate any northern quolls prior to clearing.

Conditions

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

- A fauna management condition to ensure that surveys are undertaken for northern quolls and dens.

3.3. Relevant planning instruments and other matters

The clearing permit application application was advertised on 19 August 2022 by the Department of Mines, Industry Regulation and Safety inviting submissions from the public. No submissions were received in relation to this application.

There is one native title claim (WC1999/014) over the area under application (DPLH, 2022). This claim has been determined by the Federal Court on behalf of the claimant group. However, the mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are no registered Aboriginal Sites of Significance within the application area (DPLH, 2022). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

Other relevant authorisations required for the proposed land use include:

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

It is the proponent's responsibility to liaise with the Department of Water and Environmental Regulation and the Department of Biodiversity, Conservation and Attractions, to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

End

Appendix A. Site characteristics

A.1. Site characteristics

Characteristic	Details
Local context	The area proposed to be cleared is part of an isolated tract of native vegetation in the extensive land use zone of Western Australia (GIS Database). It is a former mine site that is to have mineral production resumed.
Ecological linkage	According to available databases, the application area does not contain any known or mapped ecological linkages (GIS Database).
Conservation areas	The closest conservation area is the Mungaroona Range Nature Reserve, which is located approximately 55 kilometres south, south-east of the application area (GIS Database).
Vegetation description	The vegetation of the application area is broadly mapped as the following Beard vegetation association: 649: Sedgeland; Various sedges with very sparse snakewood (GIS Database). A flora and vegetation survey was conducted over the application area by Astron Environmental Services (Astron) during 13-16 September 2006. The following vegetation types were recorded within the application area (Astron, 2006; Onshore, 2005; VLA, 2021): **DRAINAGE LINES AND ZONES** <u>*Acacia tumida* shrubland/heath drainage lines</u> **D1**: Open scrub (30-70% 2m) of *Acacia tumida* with occasional *Acacia pyrifolia, Acacia ancistrocarpa, Acacia bivenosa* over open low shrubland (2-10% <1m) of *Indigofera monophylla* over hummock grassland of *Triodia wiseana* and *Triodia angusta*. **D2**: Tall shrubland of *Acacia tumida* with frequent *Acacia pyrifolia* over low shrubland (10-30%) to low open heath (30-70% 1m) of *Isotropis atropurpurea, Cajanus cinereus, Indigofera monophylla, Tephrosia rosea* var. *clementii* over very open (2-10%) hummock grassland of *Triodia epactia.* **D3**: Regenerating open low shrubland (2-15% <1m) of *Acacia tumida, Acacia pyrifolia* over dwarf open heath (30-70% <0.5m) of *Corchorus elachocarpus, Isotropis atropurpurea, Goodenia stobbsiana* over very open regenerating hummock grassland (2-10%) of *Triodia epactia*. Very scattered *Corymbia hamersleyana.* **D4**: Open tall shrubland (2-10% >2m) of *Acacia inaequilatera* over low open heath of *Acacia tumida* (30-70% 1m) over dense herbland of *Corchorus elachocarpus* and *Solanum diversiflorum* over open hummock grassland of *Triodia epactia.* There are scattered low *Corymbia hamersleyana.* <u>*Acacia acradenia* shrubland/heath drainage lines</u> **D5**: Open heath (30-70% 1-2m) of *Acacia acradenia* with some *Acacia bivenosa, Senna pruinosa* over open low shrubland (2-10% <1m) of *Indigofera monophylla, Tephrosia rosea* var. *clementii* over hummock grassland of mixed *Triodia wiseana* and *Triodia angusta*. **D6**: Open heath (30-70% 1-2m) of *Acacia acradenia, Acacia bivenosa* with some *Acacia orthocarpa, Acacia pyrifolia* over hummock grassland of *Triodia angusta* with some *Triodia epactia.* **D7**: Open heath (30-70% 1-2m) of *Acacia ancistrocarpa, Acacia acradenia* over hummock grassland of *Triodia epactia* with some *Triodia angusta.* **D8**: Low open heath (30-70% 1m) of *Acacia ancistrocarpa* over hummock grassland of *Triodia epactia* and some *Triodia angusta*. There can be scattered *Corymbia hamersleyana*. <u>*Acacia orthocarpa* shrubland/heath drainage lines</u> **D9**: Low shrubland (10-30%) to open low heath (30-70% 1m) of *Acacia orthocarpa* over hummock grassland of *Triodia epactia, Triodia angusta*. There are scattered *Acacia pyrifolia, Acacia ancistrocarpa, Acacia acradenia.* **D10**: Mixed tall heath (30-70% >2m) of *Acacia bivenosa, Acacia acradenia, Acacia pyrifolia, Acacia ancistrocarpa* over hummock grassland of *Triodia epactia, Triodia angusta.*

Characteristic	Details
	D11: Mixed tall heath (30-70% >2m) of *Acacia ancistrocarpa, Acacia acradenia, Acacia bivenosa* over tall hummock grassland of *Triodia angusta* with occasional *Triodia epactia* and scattered *Corymbia hamersleyana*. **D12**: Mixed shrubland (10-30%) to heath (30-45% 1-2m) of *Acacia ancistrocarpa, Acacia pyrifolia, Acacia tumida, Acacia inaequilatera* over hummock grassland of *Triodia angusta* and *Triodia epactia*. Scattered, sometimes open (2%) *Corymbia hamersleyana*. **D13**: Mixed open tall shrubland (2-10% >2m) of *Grevillea wickhamii, Acacia pyrifolia, Acacia tumida* over low open heath (30-70% 1m) of *Acacia acradenia* over hummock grassland of *Triodia epactia, Triodia angusta*. **HILL SPLOPES** <u>*Acacia bivenosa* shrubland on hill slopes</u> **H1**: Low shrubland (10-30% 1m) sometimes heath (30-40%) of *Acacia bivenosa* over hummock grassland of *Triodia wiseana*. There can be scattered *Acacia inaequilatera*. **H2**: Low shrubland (10-30% 1m) of *Acacia bivenosa* with *Senna pruinosa* over hummock grassland of *Triodia angusta*. Scattered, sometimes open (2%) *Acacia inaequilatera*. **H3**: Low shrubland (10-30% 1m) of *Acacia bivenosa* over dwarf open shrubland (2-10% 1m) of *Indigofera monophylla, Corchorus laniflorus* over hummock grassland of *Triodia epactia* with occasional *Triodia wiseana*. **H4**: Regenerating low shrubland (10-30% <1m) of *Acacia bivenosa* with *Acacia pyrifolia* over dense dwarf shrubland (30-70% <0.5m) of *Tephrosia rosea* subsp. *clementii, Indigofera monophylla* over patchy regenerating hummock grassland of *Triodia epactia*. <u>*Acacia pyrifolia* shrubland on hill slopes</u> **H5**: Regenerating shrubland to heath (10-40%) of *Acacia pyrifolia* over dwarf open heath (30-70% <0.5m) of *Indigofera monophylla, Corchorus elachocarpus, Solanum diversiflorum, Tribulus platypterus* over regenerating open hummock grassland (10-30%) of *Triodia wiseana*. **H6**: High shrubland (10-30% >2m) of *Acacia pyrifolia.* There can be occasional *Acacia ancistrocarpa, Acacia orthocarpa, Acacia bivenosa* over hummock grassland of *Triodia epactia*. May be very scattered *Corymbia hamersleyana.* **H7**: Hummock grassland of *Triodia epactia.* There are scattered *Acacia bivenosa, Acacia ancistrocarpa, Acacia inaequilatera.* **H8**: Closed hummock grassland of *Triodia epactia.* There are scattered *Acacia pyrifolia and Acacia bivenosa.* <u>Mixed shrubland on hill slopes</u> **H9**: Mixed shrubland (10-30% 1-2m) of *Acacia bivenosa, Acacia pyrifolia, Acacia acradenia* over open (2-10%) to low shrubland (10-30% <1m) of *Indigofera monophylla* over hummock grassland of *Triodia epactia* and *Triodia wiseana*. **H10**: Mixed shrubland (10-30% 1m) of *Acacia ancistrocarpa, Acacia bivenosa* with scattered *Petalostylis labicheoides, Acacia pyrifolia* over open herbland (2-0%) of *Goodenia stobbsiana, Corchorus elachocarpus* over hummock grassland of *Triodia angusta.* **H11**: Mixed open low shrubland (2-10% 1m), sometimes low shrubland (10-30%) of *Acacia bivenosa, Acacia ancistrocarpa, Acacia pyrifolia* over mixed hummock grassland of *Triodia epactia, Triodia wiseana*. There are scattered (<2%) *Acacia inaequilatera.* **H12**: Mixed low shrubland (10-30%) to open heath (30-50% 1m) of *Acacia bivenosa, Acacia acradenia, Acacia ancistrocarpa* over regenerating hummock grassland of *Triodia wiseana* with *Triodia epactia.* **H13**: Mixed open (2-10%) to low shrubland (10-30% 1m) of *Acacia bivenosa, Acacia stellaticeps, Acacia ancistrocarpa* over hummock grassland of *Triodia angusta*. There can be scattered tall shrub *Acacia inaequilatera,* and low tree *Corymbia hamersleyana*. **H14**: Mixed open shrubland (2-10% 1-2m) of *Acacia pyrifolia* and *Acacia orthocarpa* over open dwarf shrubland (2-10 (-20)%, <0.5m) of *Indigofera monophylla* over hummock grassland. <u>*Acacia acradenia* shrubland on hill slopes</u>

Characteristic	Details
	H15: Low open heath (30-70% 1m) of *Acacia acradenia* with scattered *Acacia pyrifolia, Acacia bivenosa, Acacia ancistrocarpa* over regenerating hummock grassland of *Triodia epactia.* <u>*Senna glutinosa* subsp. *pruinosa* shrubland on hill slopes</u> **H16**: Tall shrubland (10-30% >2m) of *Senna glutinosa* subsp. *glutinosa* with scattered shrubs *Acacia ancistrocarpa, Acacia pyrifolia, Acacia bivenosa* over hummock grassland of *Triodia wiseana* with *Triodia epactia*. **HILL RIDGES AND CRESTS** <u>Open shrub and herbland on hill ridge and crest</u> **HR1**: Open shrubland of *Acacia pyrifolia, Cullen lachnostachys, Senna glutinosa* subsp. *pruinosa* over open dwarf shrub and herbland of *Corchorus laniflorus, Goodenia stobbsiana,* over hummock grassland of *Triodia epactia* with patches *Cymbopogon ambiguus, Eriachne mucronata*. <u>Hummock grassland and herbs on hill crest</u> **HR2**: Hummock grassland of *Triodia wiseana* with *Triodia epactia*. Can be open dwarf shrubland of *Indigofera monophylla* and scattered *Acacia inaequilatera*. **FLAT STONY PLAINS** <u>Hummock grassland on plains</u> **P1**: Hummock grassland of *Triodia epactia*. There can be scattered shrubs (<2%) of *Acacia inaequilatera, Acacia bivenosa, Acacia ancistrocarpa, Acacia pyrifolia*. **P2**: Hummock grassland of *Triodia wiseana*. There can be scattered shrubs *Acacia inaequilatera, Acacia bivenosa* and small herb pockets of *Senna notabilis, Corchorus elachocarpus*. <u>*Acacia* shrubland on plains</u> **P3**: Mixed open (2-10%) to shrubland (10-30% 1-2m) of *Acacia ancistrocarpa, Acacia bivenosa, Senna glutinosa* subsp. *glutinosa* over hummock grassland of *Triodia angusta* with patches of *Triodia epactia* and *Triodia wiseana*. **P4**: Low shrubland (10-30% 1m) of *Acacia bivenosa* over dwarf open shrubland (2-10% <0.5m) of *Indigofera monophylla, Corchorus laniflorus* over hummock grassland of *Triodia epactia* with occasional *Triodia wiseana.* **P5**: Open tall shrubland (2-10% >2m) of *Acacia inaequilatera* over regenerating low shrubland (10-30% 1m) of *Acacia bivenosa, Acacia ancistrocarpa* over dense herbland (30-70%) of *Corchorus elachocarpus*, *Solanum diversiflorum* over mixed hummock grassland of *Triodia wiseana, Triodia epactia, Triodia angusta*. **P7**: Regenerating mixed open low shrubland (2-10% 1m) of *Acacia bivenosa, Acacia ancistrocarpa, Acacia pyrifolia, Acacia orthocarpa* over dwarf shrubland to open heath (15-50% <0.5m) of *Corchorus elachocarpus* over regenerating hummock grassland of *Triodia epactia*. **P8**: Very mixed shrubland (10-30% 1-2m) of *Acacia pyrifolia* with *Acacia bivenosa, Acacia acradenia, Acacia inaequilatera* over open dwarf shrubland (2-10% <1m) of *Indigofera monophylla* over hummock grassland of *Triodia epactia* and *Triodia wiseana*.
Vegetation condition	The vegetation survey and aerial imagery indicate the vegetation within the proposed clearing area is in 'completely degraded' to 'good' condition (Trudgen, 1991). The full Trudgen (1991) condition rating scale is provided in Appendix C.
Climate and landform	The application area is mapped within elevations of 50-90 metres AHD. The annual average rainfall (Port Hedland) is 317.7 millimetres (BoM, 2022).
Soil description	The soil is mapped as Fa19 and MM18 (GIS Database). The Fa19 soil unit is described as 'Steep stony hills and ranges on metamorphosed basic and ultrabasic rocks, with some iron ore formations. There may also be small areas of granite. Limited areas of steep dissected pediments and valley plains are included. The soils are generally shallow and stony and there

Characteristic	Details
	are extensive areas without soil cover.' The MM18 soil unit is described as 'a complex pattern of steep stony hills and valley plains along with some steep pediments. The hills are largely formed by metamorphosed basic and ultrabasic rocks as well as basic lavas, dolerite, and metamorphosed sediments. There are extensive areas without soil cover on the hills.
Land degradation risk	The application area lies within the Ruth land system (GIS Database). This land system has been mapped and described in technical bulletins produced by the former Department of Agriculture (now the Department of Primary Industries and Regional Development). The Ruth land system is described as hills and ridges of volcanic and other rocks supporting hard spinifex (occasionally soft spinifex) grasslands (Van Vreeswyk et al., 2004). This land system is prone to fairly regular burning but is not susceptible to erosion (Van Vreeswyk et al., 2004).
Waterbodies	The desktop assessment and aerial imagery indicated that numerous minor, non-perennial watercourses transect the area proposed to be cleared (GIS Database).
Hydrogeography	The application area is not within any legislated surface or groundwater areas. The mapped groundwater salinity is 1,000-3,000 milligrams per litre total dissolved solids which is described as marginal (GIS Database).
Flora	There has been no previous records of Threatened or Priority flora within the application area. VLA (2021) undertook a review of flora surveys which have previously been undertaken that include the application area. Based on records from these surveys and the habitats present, there are three species of priority flora which were determined to be possible within the permit area.
Ecological communities	There are no mapped Priority or Threatened Ecological Communities within the application area. The closest TEC or PEC is the Priority 3 Horseflat Land System PEC located approximately 1.259 kilometres north-west of the application area (GIS Database).
Fauna	According to available databases, two conservation significant fauna species have been recorded within the local area (20 kilometre radius) (GIS Database). These species are *Macroderma gigas* (Ghost Bats) and *Dasyurus hallucatus* (Northern Quoll).

A.2. Flora analysis table

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

Species name	Conservation status	Suitable habitat features ? [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]
Tephrosia rosea var. Port Hedland	Priority 1	Y	Y	>20 km	0	NA
Euploca mutica	Priority 3	Y	Y	>5 km	1	NA
Goodenia nuda	Priority 4	Y	Y	>10 km	0	NA
Rhynchosia bungarensis	Priority 4	Y	Y	<20 km	0	NA

A.3. 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]
Dasyurus hallucatus (Northern Quoll)	Endangered	Y	Y	<5km	NA	Y
Macroderma gigas (Ghost Bats)	Vulnerable	N	NA	<5km	NA	Y

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

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."* Assessment: There are no Threatened or Priority Ecological Communities located within the application area (GIS Database). There are no records of any conservation significant flora within the application area. There is potential habitat for four Priority flora species, however, the application area is not likely to represent significant habitat for these species and none were recorded within the application area (VLA, 2021). The fauna habitats within the application area are common in the local area and are not likely to support a high level of faunal diversity (VLA, 2021).	Not likely to be at variance	Yes *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."* Assessment: The area proposed to be cleared does contain critical foraging and denning habitat for conservation significant fauna (VLA, 2021; ANAX, 2022).	At variance	Yes *Refer to Section 3.2.2, above.*
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: The area proposed to be cleared is unlikely to contain habitat flora species listed under the BC Act.	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."* Assessment: There are no known Threatened Ecological Communities (TECs) located within or in close proximity to the application area (GIS Database). Flora and vegetation surveys of the application area have not identified any TECs and a desktop review did not consider any TECs likely to be present (VLA, 2021; ANAX, 2022).	Not likely to be at variance	No
Environmental value: significant remnant vegetation and conservation areas		
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."* Assessment: The application area falls within the Pilbara Bioregion of the Interim Biogeographic Regionalisation for Australia (GIS Database). Approximately 99.57% of the pre-European vegetation still exists in the Pilbara Bioregion (Government of Western Australia, 2019). The application area is broadly mapped as Beard vegetation association 649: Sedgeland; Various sedges with very sparse snakewood (GIS Database). This vegetation association has not been extensively cleared as over 99% of the pre-European extent of this vegetation association remains uncleared at both the state and bioregional level (Government of Western Australia, 2019). The permit area does not contain any remnants nor does it form part of any remnants in the local area (GIS Database).	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."* Assessment: There are no conservation areas in the vicinity of the application area. The nearest DBCA managed land is the Mungaroona Range Nature Reserve, which is located approximately 55 kilometres south, south-east of the application area (GIS Database).	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
Given the distance to the nearest conservation area, the proposed clearing is unlikely to impact on the environmental values of any conservation area.		
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."* Assessment: There are numerous minor ephemeral drainage lines which intersect the application area (GIS Database). These drainage lines are common in the local area (20 kilometre radius) and the proposed clearing is not likely to have a significant impact on riparian vegetation and surface water flow on a broader scale. Many of the drainage lines within the application area have already been impacted by previous mining activity.	At variance	No
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The application area lies within the Ruth land system (GIS Database). This land system has been mapped and described in technical bulletins produced by the former Department of Agriculture (now the Department of Primary Industries and Regional Development). The Ruth land system is described as hills and ridges of volcanic and other rocks supporting hard spinifex (occasionally soft spinifex) grasslands (Van Vreeswyk et al., 2004). This land system is prone to fairly regular burning but is not susceptible to erosion (Van Vreeswyk et al., 2004).	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."* Assessment: There are no Public Drinking Water Source Areas within or in close proximity to 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. The proposed clearing is unlikely to cause deterioration in the quality of underground water.	Not likely to be at variance	No
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."* Assessment: 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. 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. However, the proposed clearing is unlikely to increase the incidence or intensity of natural flooding events.	Not likely to be at variance	No

Appendix C. Vegetation condition rating scale

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

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Trudgen, M.E. (1991) *Vegetation condition scale* in National Trust (WA) 1993 Urban Bushland Policy. National Trust of Australia (WA), Wildflower Society of WA (Inc.), and the Tree Society (Inc.), Perth.

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

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

Appendix D. Sources of information

D.1. GIS databases

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

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Contours (DPIRD-073)
- Clearing Regulations – Schedule One Areas (DWER-057)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Groundwater Salinity Statewide (DWER-026)
- Hydrographic Catchments – Catchments (DWER-028)
- Hydrography – Inland Waters – Waterlines
- Hydrography, Linear (DWER-031)
- IBRA Vegetation Statistics
- Native Title (ILUA) (LGATE-067)
- Pre-European Vegetation Statistics
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Mapping – Best Available (DPIRD-027)
- Soil Landscape Mapping – Rangelands (DPIRD-064)
- WA Now Aerial Imagery

Restricted GIS Databases used:

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

D.2. References

ANAX (2022) Whim Creek Copper-Zinc Project, Whim Creek Minesite and Waste Rock Landform Expansion. Unpublished report prepared by ANAX Metals Limited, July 2022.

Astron (2006) Mons Cupri Vegetation and Flora Survey. Prepared For Straits (Whim Creek) Pty Ltd, by Astron Environmental Services, November 2006.

Bamford (2021) Whim Creek Fauna Assessment. Report prepared for Tetris Environmental Pty Ltd, by Bamford Consulting Ecologist, April 2021.

BoM (2022) Bureau of Meteorology Website – Climate Data Online, Port Hedland. Bureau of Meteorology. http://www.bom.gov.au/climate/data/ (Accessed 27 September 2022).

Department of Planning, Lands and Heritage (DPLH) (2022) Aboriginal Heritage Inquiry System. Department of Planning, Lands and Heritage. https://espatial.dplh.wa.gov.au/AHIS/index.html?viewer=AHIS (Accessed 27 September 2022).
Department of Water and Environmental Regulation (DWER) (2021) Procedure: Native vegetation clearing permits. Joondalup. Available from: https://dwer.wa.gov.au/sites/default/files/Procedure_Native_vegetation_clearing_permits_v1.pdf
Environmental Protection Authority (EPA) (2016) Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment. Available from: http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/EPA%20Technical%20Guidance%20-%20Flora%20and%20Vegetation%20survey_Dec13.pdf
Environmental Protection Authority (EPA) (2020) Technical Guidance – Terrestrial Fauna Surveys. Available from: https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/2020.09.17%20-%20EPA%20Technical%20Guidance%20-%20Vertebrate%20Fauna%20Surveys%20-%20Final.pdf
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
Onshore (2007) Flora and Vegetation Survey. Whim Creek Copper Mine. Prepared for Straits Whim Creek Pty Ltd, by Onshore Environmental, January 2007.
Trudgen, M.E. (1991) Vegetation condition scale in National Trust (WA) 1993 Urban Bushland Policy. National Trust of Australia (WA), Wildflower Society of WA (Inc.), and the Tree Society (Inc.), Perth.
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.
VLA (2021) Whim Creek Copper-Zinc Project Mine Expansion Mons Cupri. Desktop Review and Update of Vegetation and Flora Studies. Prepared for Tetris Environmental, by Vicki Long & Associates, June 2021.
Western Australian Herbarium (1998-) FloraBase - the Western Australian Flora. Department of Biodiversity, Conservation and Attractions, Western Australia. https://florabase.dpaw.wa.gov.au/ (Accessed 27 September 2022).

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)
DMIRS	Department of Mines, Industry Regulation and Safety, Western Australia
DMP	Department of Mines and Petroleum, Western Australia (now DMIRS)
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.