



Clearing Permit Decision Report

1. Application details and outcomes

1.1. Permit application details

Permit number:	9242/3
Permit type:	Purpose Permit
Applicant name:	Evolution Mining (Mungari) Pty Ltd
Application received:	16 April 2026
Application area:	200 hectares
Purpose of clearing:	Mineral production and associated activities
Method of clearing:	Mechanical removal
Tenure:	Mining Lease 15/1827, Mining Lease 15/1831 Miscellaneous Licence 15/391
Location (LGA area):	Shire of Coolgardie
Colloquial name:	Rayjax Project

1.2. Description of clearing activities

Evolution Mining (Mungari) Pty Ltd proposes to clear up to 200 hectares of native vegetation within a boundary of approximately 318.5 hectares, for the purpose of mineral production and associated activities for the Rajex project. The project is located approximately 18 kilometres north of Coolgardie, within the Shire of Coolgardie. The Rajex project includes an open pit, run of mine pad, waste rock landform, water dam, and support buildings and infrastructure in the western area of the permit boundary and a haul road, which runs east from this area.

Clearing permit CPS 9242/1 was granted by the Department of Mines, Industry Regulation and Safety (now the Department of Mines, Petroleum and Exploration) on 23 June 2021 and was valid from 16 July 2021 to 15 July 2026. The permit authorised the clearing of up to 200 hectares of native vegetation within a boundary of approximately 318.5 hectares, for the purpose of mineral production and associated activities.

It is noted that in January 2026, the permit holder applied to amend CPS 9242/1 to amend the permit boundary to include a new mining tenement and revise the shape without increasing the overall approved area. This application was accepted as CPS 9242/2 but was subsequently withdrawn by the proponent in March 2026. On 16 April 2026, the permit holder applied to amend CPS 9242/1 to extend the duration of the permit for a further five years.

Based on the most recent annual clearing report (reporting period 1 July 2024 to 30 June 2025, dated 31 July 2025), a total of 61.47 hectares of native vegetation have been cleared under CPS 9242/1, with additional amounts cleared using relevant exemptions

1.3. Decision on application and key considerations

Decision:	Grant
Decision date:	7 July 2026
Decision area:	200 hectares of native vegetation

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed, and determined in accordance with sections 51KA(1) and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Mines, Petroleum and Exploration (DMPE) advertised the application for public comment for a period of 7 days, and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (Appendix A), relevant datasets (Appendix E), and supporting information provided by the applicant including the results of a flora and vegetation survey (Appendix D), the clearing principles set out in Schedule 5 of the EP Act (Appendix B), proposed avoidance and minimisation measures (Section 3.1), relevant planning instruments and any other matters considered relevant to the assessment (Section 3.3). The Delegated Officer also took into consideration the purpose of the clearing to facilitate mineral production and associated activities.

The assessment has not changed since that for CPS 9242/1, except for principle (e), where the variance has changed from 'not at variance' to 'not likely to be at variance'. This change reflects that, while the amount of clearing under this permit is small

relative to the remaining vegetation in the bioregion, clearing under other permits has occurred in the local region, and will continue to occur over the duration of this permit and in to the future. The Delegated Officer determined that the proposed five year extension of CPS 9242/1 is not likely to lead to an unacceptable risk to environmental values.

The Delegated Officer decided to grant a clearing permit subject to the conditions included in CPS 9242/1 being updated to reflect the current approach to managing fauna impacts, including a condition on undertaking one-directional clearing:

- avoid, minimise to reduce the impacts and extent of clearing;
- take hygiene steps to minimise the risk of the introduction and spread of weeds
- commence construction no later than three months after undertaking clearing to reduce the risk of erosion;
- where active (in-use) *Leipoa ocellata* (malleefowl) mounds are identified, no clearing should occur within 200 metres of the mound between September and January;
- for inactive *Leipoa ocellata* (malleefowl) mounds during this same period, clearing should not occur within 50 metres of the identified mound; and
- undertake slow, progressive, one-directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity.

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 (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, 2014)
- Procedure: Native vegetation clearing permits (DWER, 2021)
- Technical guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016b)
- Technical guidance – Terrestrial Fauna Surveys for Environmental Impact Assessment (EPA, 2020)
- Guideline for Cumulative Impact Assessment (EPA, 2026)

3. Detailed assessment of application

3.1. Avoidance and mitigation measures

The clearing permit application by Evolution Mining (Mungari) Pty Ltd noted the following avoidance and mitigation measures:

- Disturbance works have been sited such that key environmental values are avoided, or impact reduced to as low as reasonably practicable (ALARP). Clearing will be conducted on an 'as required' basis, and survey pickups will be carried out before and after clearing.

The annual clearing report for the 2025 financial year Evolution (2025) reports that, while no clearing was undertaken under CPS 9242/1, a small amount of clearing was undertaken under exemptions (Regulation 5, Item 20 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*). In the 2024 financial year clearing report, 61.47 hectares of clearing was reported (Evolution, 2024). A review of information provided in this report concluded the proponent was compliant with the conditions required under CPS 9242/1.

It is noted that, while outside the boundary of CPS 9242/3, any future clearing under Regulation 5, Item 20 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* on Mining Lease 15/1831 would need to be consistent with the condition prohibiting clearing within 100 metres of the *Eucalyptus yilgarnensis* tree with a recorded *Camponotus terebrans* colony, as discussed below.

3.2. Assessment of impacts on environmental values

A review of current environmental information (Appendix A) confirms that assessment of clearing principles completed in the decision report for CPS 9242/1 remains valid.

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

Assessment

As per Appendices A.1 (Site characteristics), A.3 (flora analysis) and D.2 (biological survey extracts), conservation significant flora and weed species have the potential to occur within the application area (Botanica Consulting, 2021a; Spectrum Ecology, 2019).

Vegetation types within the application area are dominated by open Eucalypt woodlands (Botanica Consulting, 2021a; Spectrum Ecology, 2019). Vegetation types described within the application area are all represented in surrounding areas, indicating a wider distribution. There are no records of any Threatened or Priority Ecological Communities (TEC/PEC) within the application area, and the flora and vegetation surveys did not identify any vegetation communities which represent a TEC or PEC (Botanica Consulting, 2021a; Spectrum Ecology, 2019).

The application area falls within the area known as the Great Western Woodlands, which represents the largest and most intact eucalypt woodland remaining in southern Australia and is one of the best examples of its type in the world (DEC, 2010). The Great Western Woodlands covers a total area of approximately 16 million hectares, and is recognised for its flora and fauna species richness and high number of endemic flora species (DEC, 2010). However, at approximately 200 hectares in size, the clearing permit application area represents a very small portion of the area covered by the Great Western Woodlands, and the proposed clearing is unlikely to have any significant impact on the conservation values of the Great Western Woodlands.

Priority Flora

Allocasuarina eriochlamys subsp. *grossa* (P3) is a small shrub to 3 metres tall with a form typical of the *Allocasuarina* genus that inhabits clay-loam on hills or within Eucalypt woodlands (Western Australian Herbarium, 1998-). Preferred habitat for this species is usually located on or near granite outcrops (Western Australian Herbarium, 1998-; Wilson & Johnson, 1989). Available datasets shows a record of this species within 400 metres of the application area, however, Spectrum Ecology (2019) noted that no habitat for this species was present within the application area. Therefore, *Allocasuarina eriochlamys* subsp. *grossa* is unlikely to occur, and is therefore unlikely to be impacted by the proposed clearing.

Brachysola halganiacea (P2) is a shrub with mauve flowers growing up to 0.5 metres tall, known from four records (Western Australian Herbarium, 1998-). The nearest record of this species is approximately 10 kilometres from the application area (GIS Database) and appears to be associated with deep yellow sands on flats (Western Australian Herbarium, 1998-), which are not present in the application area. Therefore, this species is unlikely to be impacted by the proposed clearing.

Calandrinia lefroyensis (P1) occurs in the Eastern Goldfields within the Coolgardie bioregion (Western Australian Herbarium, 1998-). This species is known from three lakes south of Kalgoorlie, inhabiting areas on salt-lake flats amongst samphire communities, with soil types described as brown silty loams or brown-grey sandy clays (Obbens, 2018). No habitat for this species occurs within the application area, therefore it is unlikely to be impacted by the proposed clearing (Spectrum Ecology, 2019).

Chamelaucium sp. Coolgardie (P. Pavlovic 289) (P1) is a shrub to approximately one metre with white flowers. It is only known from two records approximately 14 kilometres from the application area (Western Australian Herbarium, 1998-; GIS Database), however seem to be associated with yellow sand plains and also disturbed areas (Western Australian Herbarium, 1998-). One of the Western Australian Herbarium records noted that this species was locally common, so even if present in the application area, it is considered that clearing is unlikely to have a significant impact.

Eremophila praecox (P2) is a tall, broom-like shrub that occurs on red, brown sandy loam undulating plains across the Eastern Goldfields and Eastern Murchison IBRA subregions (Western Australian Herbarium, 1998-). The flowers are purple, tinged white on the outside. Flowering occurs from October to December and is followed by fruits which are dry, woody, cone-shaped to oval-shaped (ALA, n.d). The closest record is six kilometres from the application area (GIS Database). *Eremophila praecox* was considered to be 'possibly occurring' by Botanica (2021a), however, only a small area of suitable habitat is present. This vegetation type was only recorded over a small section of the proposed haul road (approximately 15 hectares) (Spectrum Ecology, 2019). Given only a small amount of habitat is likely to be cleared, the proposed clearing is not likely to have a significant impact on this species.

Eucalyptus jutsonii subsp. *jutsonii* (P4) is a mallee growing up to around six metres, identifiable by its rough bark over most of the stems (Euclid, n.d; Western Australian Herbarium, 1998-). This species is known from 36 records in the Western Australian Herbarium and, despite its relatively limited range, occurs across two IBRA subregions (Euclid, n.d; Western Australian Herbarium, 1998-). While Spectrum Ecology (2019) assessed the likelihood of it occurring as 'high', this was in the context of the overall study area. There is no habitat for this species recorded in the application area (Spectrum Ecology, 2019).

Notisia intonsa (P3) inhabits a range of habitats including sandy loams (Western Australian Herbarium, 1998-). *Notisia intonsa* has been recorded seven kilometres from the application area (GIS Database). As the application area contains suitable habitat for the species, the likelihood was assessed as 'possible' by Botanica (2021a) and 'medium' by Spectrum (2019). As this species is known from 29 records in the Western Australian Herbarium (1998-), with several records within a conservation estate, and is known to inhabit disturbed areas, the proposed clearing is unlikely to result in a significant impact to this species.

Rhodanthe uniflora (P1) can inhabit clayey or gravelly soils in open Eucalypt woodlands (Western Australian Herbarium, 1998-). It is known from three records within Western Australia, with additional records in South Australia (Western Australian Herbarium, 1998-). The nearest record is located approximately 34 kilometres north-east of the application area (GIS Database). As the application area contains suitable habitat for the species, the likelihood was assessed as 'possible' by Botanica (2021a) and 'medium' by Spectrum (2019). This species is an annual and typically flowers from August to October (Western Australian Herbarium, 1998-; Wilson, 1992), and therefore should have been detectable during both surveys. This species is known from other subregions, so if it does occur within the application area, the proposed clearing is unlikely to have a significant impact at a species level.

Weeds

No species of weeds were recorded during the field assessment of the permit area (Botanica Consulting, 2021a; Spectrum Ecology, 2019). Botanica (2021a) identified 83 weed species, including seven that are weeds of national significance, that may occur in the application area. 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

Based on the above assessment, the proposed clearing will result in disturbance to potential habitat for priority flora and increased potential for the introduction of weeds. It is considered that the conditions set out in CPS 9242/1 are still appropriate to manage these impacts.

Conditions

Consistent with CPS 9242/1, the following management measures will be applied as clearing permit conditions:

- avoid, minimise and reduce the impacts and extent of clearing on native vegetation; and
- take hygiene steps to minimise the risk of the introduction and spread of weeds.

3.2.2. Biological values (fauna) - Clearing principle (b)

Assessment

Based on known records and the habitat present, there are several fauna species of conservation significance which have the potential to occur within the application area. The species with the greatest possibility of being found are: arid bronze azure butterfly (*Ogyris petrina* - Critically Endangered), malleefowl (*Leipoa ocellata* - Vulnerable), grey falcon (*Falco hypoleucos* - Vulnerable), peregrine falcon (*Falco peregrinus* - Other specially protected species), and inland hairstreak (*Jalmenus aridus* - Priority 1) (Botanica Consulting, 2021a; Spectrum Ecology, 2019).

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

The arid bronze azure butterfly (*Ogyris petrina* – Critically Endangered) was considered to have a medium likelihood of occurring within the application area (Spectrum Ecology, 2019). The arid bronze azure butterfly is associated with colonies of *Camponotus terebrans*, a sugar ant that is associated with smooth bark Eucalyptus species. Smooth bark Eucalypt trees are present within the application area; *Eucalyptus salmonophloia* and *Eucalyptus salubris* (Botanica Consulting, 2021a; Spectrum Ecology, 2019). This species is only known from two locations near Barbalin in the wheatbelt, and near Lake Douglas, approximately 25 kilometres southeast of the application area (although no records have been recorded since 1993). Confirmation on the presence or absence of this species can only be determined by an appropriate survey. A targeted search for *Camponotus terebrans* near smooth bark Eucalypts within the application area was undertaken in May 2021 (Botanica Consulting, 2021b). There were *Camponotus terebrans* observed near the base of an individual *Eucalyptus yilgarnensis* in the northwest corner of the application area (Botanica Consulting, 2021b). There were less than 10 ants observed, which suggests that there is only a small colony present in the area (Botanica Consulting, 2021b). The arid bronze azure butterfly requires large colonies of host ants to support it, and it is not usually associated with *Eucalyptus yilgarnensis*. A basic fauna survey conducted by Botanica Consulting in 2025 included three targeted searches for ABAB. No ABAB were observed in the survey area. Although the host ant is present, it is unlikely the ABAB is present in the application area (Botanica Consulting, 2026).

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

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

Records from other areas surveyed in the nearby area (15 kilometre radius) also recorded six potential short-range endemic species (SRE) (Spectrum Ecology, 2019). This indicates that the nine potential SREs recorded are not likely to be confined to the application area. Habitats known to support SRE species such as vine thickets, boulder piles, isolated hills, vegetated

gullies, and freshwater habitats were not recorded in the application area. The vegetation communities within the application area are contiguous and broadly distributed outside of the permit boundary which further reduces the likelihood that any SREs are confined to the application area (Botanica Consulting, 2021a; Spectrum Ecology, 2019). The vegetation within the application area is not likely to represent significant habitat for SRE species.

Conclusion

Based on the above assessment, it is considered that the potential impacts of the proposed clearing to significant fauna and/or on potentially suitable conservation significant fauna habitat can be managed by implementing fauna management conditions that are generally consistent with those set out in CPS 9242/1. However, these have been updated to reflect changes in best practice since the grant of CPS 9242/1, and a condition requiring clearing to be carried out in a slow, progressive, one-directional manner to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity has also been included. Given a targeted search was conducted for ABAB and no evidence of its presence was recorded, a condition requiring avoidance with a 50 metre buffer of a tree where the host ant had been found has been removed.

Conditions

The following management measures will be applied as clearing permit conditions:

- where active (in-use) *Leipoa ocellata* (malleefowl) mounds are identified, no clearing should occur within 200 metres of the mound between September and January;
- for inactive *Leipoa ocellata* (malleefowl) mounds during this same period, clearing should not occur within 50 metres of the identified mound; and
- undertake slow, progressive, one-directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity.

3.3. Relevant planning instruments and other matters

The clearing permit amendment application was advertised on 24 April 2026 by the Department of Mines, Petroleum and Exploration, inviting submissions from the public. No submissions were received in relation to this application.

There are three native title claims over the area under application (DPLH, 2026). These claims have been registered with the National Native Title Tribunal on behalf of the claimant groups. However, the mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993*, and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are no registered Aboriginal Sites of Significance within the application area (DPLH, 2026). 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 noted that the proposed clearing may impact on *Leipoa ocellata* (malleefowl) and *Ogyris petrina* (arid bronze azure butterfly) which are protected matters under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act). The proponent may be required to refer the project to the (Commonwealth) Department of Climate Change, Energy, the Environment and Water for environmental impact assessment under the EPBC Act. The proponent is advised to contact the Department of Climate Change, Energy, the Environment and Water for further information regarding notification and referral responsibilities under the EPBC Act.

Other relevant authorisations required for the proposed land use include:

- A Mining Development and Closure Proposal 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. Based on information provided in support of the application, it is understood that a works approval and a groundwater licence are in place for the Rayjax Project.

End

Appendix A. Site characteristics

A.1. Site characteristics

Characteristic	Details
Local context	The area proposed to be cleared is located approximately 18 kilometres north of Coolgardie and is surrounded by largely continuous native vegetation associated with the Great Western Woodlands (DEC, 2010). The application area forms part of a broader intact vegetation landscape and does not represent an isolated remnant (GIS Database). Clearing has already occurred over much of the western portion of the application area, with an open cut mine pit, waste rock landform, laydown, and topsoil stockpile present. The central and eastern portions of the application area are mostly uncleared, except for a haul road (GIS Database).
Ecological linkage	According to available databases, the application area does not contain any known or mapped ecological linkages (GIS Database).
Conservation areas	The nearest conservation area is Kurrawang Nature Reserve, located approximately 16 kilometres south-east of the application area (GIS Database).
Vegetation description	The application area occurs within the Eastern Goldfields subregion (COO03) of the Coolgardie bioregion (GIS Database). The vegetation of the application area is broadly mapped as Beard vegetation association 9, which is described as medium woodland; coral gum (<i>Eucalyptus torquata</i>) and goldfields blackbutt (<i>Eucalyptus lesouefii</i>) (CPS 9242/1 - DMIRS, 2021; GIS Database). There have been two flora surveys conducted over the permit area: • Spectrum Ecology completed a flora and vegetation survey August 2019 and covered the proposed mining area in the west of the permit boundary and much of the proposed haul road, which runs to the east. • Botanica Consulting completed a flora and vegetation survey in October 2020 and covered the mining infrastructure in the west of the permit boundary, along with adjacent areas of vegetation to the north of the application area. The Spectrum Ecology (2019) flora survey recorded two vegetation types in the permit area: • iv: <i>Eucalyptus salubris</i>, <i>E. clelandiorum</i> (+/- <i>E. salmonophloia</i>) mid open woodland over <i>Eremophila scoparia</i> and <i>Senna artemisioides</i> ssp. <i>filifolia</i> mid open shrubland over <i>Atriplex</i> sp. and <i>Olearia muelleri</i> low open shrubland; and • vi: <i>Eucalyptus moderata</i>, <i>Eucalyptus oleosa</i> and <i>E. torquata</i> tall mallee woodland over <i>Eremophila pustulata</i> and <i>Eremophila interstans</i> ssp. <i>interstans</i> tall sparse shrubland over <i>Acacia erinacea</i>, <i>Senna artemisioides</i> ssp. <i>filifolia</i>, and <i>Atriplex vesicaria</i> low sparse shrubland. The Botanica Consulting (2021a) survey recorded three vegetation communities within the application area: Eucalyptus open woodland (clay-loam plain) CLP-EW1 - <i>Eucalyptus griffithsii</i> and <i>E. transcontinentalis</i> sparse woodland over <i>Acacia hemiteles</i> and <i>Exocarpos aphyllus</i> tall shrubland over <i>Scaevola spinescens</i>, <i>Senna artemisioides</i> subsp. <i>filifolia</i>, <i>Olearia muelleri</i> and <i>Ptilotus obovatus</i> var <i>obovatus</i> low shrubland. CLP-EW2 - <i>Eucalyptus salmonophloia</i> sparse woodland over <i>Acacia hemiteles</i> and <i>Eremophila scoparia</i> tall open shrubland over <i>Atriplex nummularia</i> and <i>A. vesicaria</i> open chenopod shrubland over <i>Frankenia setosa</i>, <i>Maireana erioclada</i> and <i>Olearia muelleri</i> low open shrubland. Eucalyptus open woodland (hillslope) HS-EW1 - <i>Eucalyptus torquata</i> and <i>E. clelandiorum</i> woodland over <i>Acacia colletioides</i>, <i>Eremophila interstans</i> subsp. <i>interstans</i> and <i>Allocasuarina campestris</i> tall open shrubland over <i>Acacia erinacea</i>, <i>Trymalium myrtillus</i> subsp. <i>myrtillus</i> and <i>Westringia rigida</i> open shrubland and <i>Triodia scariosa</i> sparse hummock grassland / <i>Olearia muelleri</i> and <i>Ptilotus obovatus</i> var <i>obovatus</i> low sparse shrubland. There were also areas mapped as 'Completely Degraded (cleared vegetation)'. Extracts from the above survey report showing vegetation types are provided in Appendix D.1
Vegetation condition	Vegetation surveys (Botanica, 2021a; Spectrum Ecology, 2019) of the application area found the vegetation to be in pristine to completely degraded condition (Keighery, 1994). The full Keighery (1994) condition rating scale is provided in Appendix C.

Characteristic	Details
Climate and landform	The climate of the Eastern Goldfields subregion is described as arid, with the nearest weather station recording an average rainfall of approximately 270 millimetres per year (BoM, 2026a). The Eastern Goldfields subregion terrain is described as gently undulating plains with a subdued relief, interrupted in the west with low hills and ridges of Archaean greenstones and in the east by a horst of Proterozoic basic granulite (Cowan, 2001). The application area is mapped at elevations of 360 to 410 metres Australian Height Datum (GIS Database).
Soil description	The application area overlays five soil landform units (DPIRD, 2026; GIS Database) mapped as: • Coolgardie land system (map unit symbol: 265Co): Uplands and undulating plains associated with ultramafic greenstones supporting eucalypt woodlands and halophytic shrublands; • Doney system (map unit symbol: 265Do): Calcareous sheetwash plains with eucalypt woodlands and a sclerophyllous shrub understorey; • Graves system (map unit symbol: 265Gr): Basalt and greenstone rises and low hills supporting eucalypt woodlands with prominent saltbush and bluebush understoreys • Gumland system (map unit symbol: 265Do): Extensive pedepains supporting eucalypt woodlands with halophytic and non-halophytic shrub understoreys; and • Lefroy system (map unit symbol: 265lf): Salt lakes and fringing saline plains, sandy plains and dunes with chenopod low shrublands. The Coolgardie, Doney, and Graves land systems comprise approximately 85 per cent of the application area, with the area mapped as being within the Lefroy system only comprising 0.63 hectares (GIS Database).
Land degradation risk	The soil stability is variable across the application area, ranging from partially unstable and dispersive to partially stable and non-dispersive (Stantec, 2019). For the Coolgardie land system, where not protected by a stony mantle, footslopes and valley floors are susceptible to water erosion, particularly in areas where perennial shrub cover is substantially reduced and/or the soil surface is disturbed (DPIRD, 2021). Apart from when perennial shrub cover is removed from drainage tracts, the Doney system land system is generally not susceptible to soil erosion (DPIRD, 2021). As noted below, there are no mapped drainage lines within the permit area (GIS Database). The stony mantles and moderately dense vegetation present in the Graves land system mean that this land system is generally not prone to erosion unless the protective stone mantle is removed (DPIRD, 2021).
Waterbodies	The desktop assessment and aerial imagery indicate that no drainage lines are present within the application area, with the nearest drainage line being a non-perennial watercourse approximately 500 metres to the south of the haul road corridor (GIS Database). The nearest Wetland of National Importance is Rowles Lagoon System, located approximately 40 kilometres north-north-west of the application area. Based on available mapping, the application area and this wetland are not hydrologically connected (GIS Database). Drainage in the local surrounds is to a series of salt lakes along paleodrainage channels (GIS Database).
Hydrogeography	The nearest Public Drinking Water Source Area is approximately 35 kilometres from the application area (GIS Database). The application area is located within the Goldfields Groundwater Area proclaimed under the <i>Rights in Water and Irrigation Act 1914</i> (GIS Database). The groundwater salinity is mapped as 14,000 to 35,000 milligrams per litre total dissolved solids, which is described as saline (BoM, 2026b; GIS Database). Based on available mapping, there are no potential terrestrial or aquatic groundwater dependent ecosystems within the application area (GIS Database).
Flora	The Botanica Consulting (2021a) flora survey recorded 65 flora taxa from 30 genera and 20 families. The Spectrum Ecology (2019) survey, which covered a much larger area, recorded 113 flora taxa from 49 genera and 28 families. No species of threatened or priority flora were recorded within the permit area (Botanica Consulting, 2021a; Spectrum Ecology, 2019). Interrogation of available datasets indicated that there are 45 records made up of 17 species of conservation significant flora within 20 kilometres of the application area (GIS Database). The closest of these is <i>Allocasuarina eriochlamys</i> subsp. <i>grossa</i>, which is approximately 380 metres from the application area. Botanica (2021a) identified 50 conservation species within 50 kilometres of the application area, while Spectrum Ecology (2019) identified 62 species, (it is noted this survey covered a number of other areas surrounding the application area and also

Characteristic	Details
	included species recorded in other flora surveys in the area), based on listings at the time. Full lists from Botanica (2021a) and Spectrum Ecology (2019) are presented in Appendix D.2, and the 17 species identified in the GIS datasets, along with those assessed as 'possible' by Botanica (2021a) and/or 'recorded' and 'high' by Spectrum Ecology (2019), greater than 20 kilometres from the application area, are listed in Appendix A.3 and discussed as needed in section 3.2.1. Spectrum Ecology (2019) identified two priority species, however these were located outside the application area.
Ecological communities	No Threatened or Priority Ecological Communities are recorded within or near the application area, with the nearest (Emu Land System – P3) being 60 kilometres to the north-east (GIS Database). The application area falls within the area known as the Great Western Woodlands, which represents the largest and most intact eucalypt woodland remaining in southern Australia and is one of the best examples of its type in the world (DEC, 2010).
Fauna	No conservation significant fauna species were recorded within the application area by either Botanica (2021a) or Spectrum (2019). There were nine potential short range endemic (SRE) invertebrate fauna species recorded within the application area (Spectrum Ecology, 2019). The species recorded consisted of four pseudoscorpions, one isopod, two millipedes, and two snails (Spectrum Ecology, 2019). Due to juvenile specimens being collected, one species of pseudoscorpion and one species of millipede could not be identified to species level (Spectrum Ecology, 2019). These are discussed further in section 3.2.2. Botanica (2021a) and Spectrum Ecology (2019) identified 10 and 14 species of conservation significant fauna, respectively, along with a number of migratory bird species, that could occur in the application area. These are presented in Appendix D.3. Targeted survey for <i>Ogyris petrina</i> (arid bronze azure butterfly) and <i>Jalmenus aridus</i> (inland hairstreak butterfly) within the application area did not identify the presence of either species (Botanica, 2021b). There are 26 records of conservation significant fauna comprised of six species that have been recorded within 20 kilometres of the application area (GIS Database). These, along with key species from Appendix D.3 are listed in Appendix A.4 and discussed as needed in section 3.3.2.
Fauna habitat	A reconnaissance fauna survey was undertaken of the permit area and other projects in the local area (Spectrum Ecology, 2019). Observations of potential fauna habitat were also made during the flora survey undertaken by Botanica Consulting (2021a). The following two broad fauna habitats have been recorded within the application area (Botanica Consulting, 2021a; Spectrum Ecology, 2019): - Eucalyptus woodland / mixed Eucalyptus woodland on clay-loam plain; and - Eucalyptus woodland on hillslopes. The Eucalyptus woodland on plains habitat covers the majority of the permit area (over 90%) (Botanica Consulting, 2021a; Spectrum Ecology, 2019). This habitat is widespread and has been recorded from other fauna surveys in the region (Spectrum Ecology, 2019). The Eucalyptus woodland on hillslopes habitat was associated with small hills which, extend outside the permit area and was only marginally covered by the permit boundary (Botanica Consulting, 2021a; Spectrum Ecology, 2019). Extracts from the above survey reports showing fauna habitat are provided in Appendix D.4. Bennelongia (2019) undertook a desktop assessment of the subterranean fauna values for a number of project areas, including the application area, and concluded that habitats in the study area have low to very low prospectivity for subterranean fauna, including both stygofauna and troglafauna.

A.2. Vegetation extent

	Pre-European area (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current extent in all DBCA Managed Land (proportion of pre-European extent) (%)
IBRA Bioregion - Coolgardie	12,912,204.35	12,648,491.39	97.96	2,114,349.37	16.37
Beard vegetation associations - State					
Veg Assoc No. 9	240,509.33	235,161.94	97.78	18,984.28	7.89
Beard vegetation associations - Bioregion					
Veg Assoc No. 9	240,441.99	235,100.97	97.78	18,984.28	7.97

Government of Western Australia (2019)

A.3. Flora analysis table

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

Species name	Conservation status	Distance of closest record to application area (km)	Number of known records ¹	Known in other IBRA subregions	Botanica (2021a) likelihood assessment	Spectrum Ecology(2019) likelihood assessment
<i>Acacia websteri</i>	1	19	21	yes	unlikely	medium
<i>Allocasuarina eriochlamys</i> subsp. <i>grossa</i>	3	0.38	28	yes	unlikely	recorded
<i>Brachysola halganiacea</i>	2	10	4	yes	NA	NA
<i>Calandrinia lefroyensis</i>	1	1	11	no	NA	recorded
<i>Chamelaucium</i> sp. Coolgardie (P. Pavlovic 289)	1	14	2	no	NA	NA
<i>Eremophila caerulea</i> subsp. <i>merrallii</i>	4	12	23	yes	unlikely	low
<i>Eremophila praecox</i>	2	6	52	yes	possible	recorded
<i>Eucalyptus educta</i>	2	21	46	yes	possible	low
<i>Eucalyptus jutsonii</i> subsp. <i>jutsonii</i>	4	16	11	yes	NA	high
<i>Eucalyptus urna</i> subsp. <i>xesta</i>	3	14	25	yes	unlikely	NA
<i>Gastrolobium graniticum</i>	T	19	43	yes	unlikely	medium
<i>Gompholobium cinereum</i>	3	9	18	yes	unlikely	low
<i>Hakea rigida</i>	2	7	19	yes	unlikely	low
<i>Notisia intonsa</i>	3	7	29	yes	possible	medium
<i>Phebalium appressum</i>	1	7	5	yes	unlikely	low
<i>Phlegmatospermum eremaeum</i>	3	19	19	yes	unlikely	medium
<i>Ptilotus rigidus</i>	1	18	21	yes	unlikely	NA
<i>Rhodanthe uniflora</i>	1	10	3	yes	possible	medium
<i>Thryptomene planiflora</i>	1	19	23	yes	unlikely	NA

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority, NR: not recorded

1 – based on records held by the Western Australian Herbarium

A.4. Fauna analysis table

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

Species name	Conservation status		Distance of closest record to application area (km)	Spectrum (2019) likelihood assessment	Botanica (2021a) likelihood assessment
	BC Act	EPBC Act			
<i>Calidris acuminata</i> (sharp-tailed sandpiper)	MI	MI	7	low	NA
<i>Calidris ferruginea</i> (curlew sandpiper)	CR	CR & MI	7	low	NA
<i>Calidris ruficollis</i> (red-necked stint)	MI	MI	7	low	NA
<i>Jaumes aridus</i> (inland hairstreak butterfly)	P2	-	18	medium	NA
<i>Leipoa ocellata</i> (malleefowl)	VU	VU	1	high	possible
<i>Tringa nebularia</i> (common greenshank)	MI	MI	7	low	NA
<i>Myrmecobius fasciatus</i> (Numbat)	EN	EN	145	low	would not occur
<i>Dasyurus geoffroyi</i> (Chuditch)	VU	VU	65	low	unlikely
<i>Macrotis lagotis</i> (Bilby)	VU	VU	179	low	would not occur
<i>Pezoporus occidentalis</i> (Night Parrot)	EN	N	127	low	would not occur
<i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo)	EN	EN	NR	medium	would not occur
<i>Ogyris petrina</i> (arid bronze azure butterfly)	CR	CR	20	medium	NA

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, MI: migratory, CD: conservation dependent, OS: other specially protected, P: priority

Appendix B. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
<u>Principle (a):</u> "Native vegetation should not be cleared if it comprises a high level of biodiversity." <u>Assessment:</u> Vegetation identified within the application area is not considered to be of high biological diversity or have local or regional significance (Botanica, 2021a; Spectrum Ecology, 2019).	Not likely to be at variance (as per CPS 9242/1)	Yes Refer to Section 3.2.1, above.
<u>Principle (b):</u> "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." <u>Assessment:</u> No conservation significant fauna were recorded and the application area, with recorded faunal habitats typical of those in the wider region; however, may provide habitat for conservation significant species (Botanica, 2021a; Spectrum Ecology, 2019).	May be at variance (as per CPS 9242/1)	Yes Refer to Section 3.2.2, above.
<u>Principle (c):</u> "Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora." <u>Assessment:</u> There are no known records of threatened flora within the application area (GIS Database). Flora surveys of the application area did not record any species of threatened flora (Botanica Consulting, 2021a; Spectrum Ecology, 2019).	Not likely to be at variance (as per CPS 9242/1)	No

Assessment against the clearing principles	Variance level	Is further consideration required?
The vegetation associations within the application area are common and widespread within the region (Botanica Consulting, 2021a; Spectrum Ecology, 2019), and the vegetation proposed to be cleared is unlikely to be necessary for the continued existence of any species of threatened flora.		
<u>Principle (d):</u> <i>"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community."</i> <u>Assessment:</u> There are no known Threatened Ecological Communities (TECs) located within or in close proximity to the application area (GIS Database). A flora and vegetation survey of the application area did not identify any TECs (Botanica Consulting, 2021a; Spectrum Ecology, 2019).	Not likely to be at variance (as per CPS 9242/1)	No
Environmental value: significant remnant vegetation and conservation areas		
<u>Principle (e):</u> <i>"Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared."</i> <u>Assessment:</u> The extent of the mapped vegetation types and native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia (Commonwealth of Australia, 2001). The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area (GIS Database).	Not likely to be at variance (changed from CPS 9242/1)	No
<u>Principle (h):</u> <i>"Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area."</i> <u>Assessment:</u> There are no conservation areas in the vicinity of the application area. The nearest DBCA managed land is the Kurrawang Nature Reserve, which is located approximately 16 kilometres south-east of the application area (GIS Database). The proposed clearing is unlikely to impact on the environmental values of any conservation area.	Not likely to be at variance (as per CPS 9242/1)	No
Environmental value: land and water resources		
<u>Principle (f):</u> <i>"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."</i> <u>Assessment:</u> The desktop assessment and aerial imagery indicated that no drainage lines or watercourses are mapped within the application area (GIS Database).	Not likely to be at variance (as per CPS 9242/1)	No
<u>Principle (g):</u> <i>"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."</i> <u>Assessment:</u> The soil stability is variable across the permit area ranging from partially unstable and dispersive to partially stable and non-dispersive (Stantec, 2019). Clearing and disturbance of soil surface will increase risk of erosion (DPIRD, 2021). A staged clearing condition will remain on the clearing permit to mitigate impacts to land degradation from the proposed clearing.	Not likely to be at variance (as per CPS 9242/1)	No
<u>Principle (i):</u> <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."</i> <u>Assessment:</u> There are no permanent watercourses or wetlands within the area proposed to be clear (GIS Database). Creek lines in the region are dry for most of the year, only flowing briefly immediately following significant rainfall. There are no Public Drinking Water Source Areas within or near the application area (GIS Database).	Not likely to be at variance (as per CPS 9242/1)	No

Assessment against the clearing principles	Variance level	Is further consideration required?
<u>Principle (j):</u> “Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.” <u>Assessment:</u> There are no permanent watercourses or waterbodies within the application area (GIS Database). The permit area has a low risk of flooding, as it is located near the top of a catchment divide (AQ2, 2019). The proposed clearing is unlikely to increase the incidence or intensity of natural flooding events.	Not likely to be at variance (as per CPS 9242/1)	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.

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

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

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

Appendix D. Biological survey information excerpts

D.1. Vegetation communities

Vegetation communities within the application area as mapped by Botanica (2021a) and Spectrum Ecology (2019) are presented in the extracts below

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Unit	Description	Landform, Soil & Geology	Sites	Area (ha)					Representative Photograph
				Castle Hill	Rayjax	Haul Road	TSF	Total	
iv	<i>Eucalyptus salubris</i> , <i>E. clelandiorum</i> (+/- <i>E. salmonophloia</i>) mid open woodland over <i>Eremophila scoparia</i> and <i>Senna artemisioides</i> ssp. <i>filifolia</i> mid open shrubland over <i>Atriplex</i> sp. and <i>Olearia muelleri</i> low open shrubland ^Priority species found within this vegetation type	Flat Plain Red Sand; Clay	R104 TSF10 MN TSF12 MN R110 R111 MN04 R115 R114 R115 R116	5.76	131.70	344.40	96.25	578.11	
v	<i>Casuarina pauper</i> low isolated trees over <i>Melaleuca lateriflora</i> mid open shrubland over <i>Frankenia setosa</i> and <i>Atriplex stipitata</i> low open shrubland	Minor Floodplain Red Sand; Clay	R105 R106	-	-	-	292.40	292.40	
vi	<i>Eucalyptus moderata</i> , <i>Eucalyptus oleosa</i> and <i>E. torquata</i> tall mallee woodland over <i>Eremophila pustulata</i> and <i>Eremophila interstans</i> ssp. <i>interstans</i> tall sparse shrubland over <i>Acacia erinacea</i> , <i>Senna artemisioides</i> ssp. <i>filifolia</i> , and <i>Atriplex vesicaria</i> low sparse shrubland	Simple Slope Red Brown Sand; Clay	R118	-	15.19	-	-	15.19	

(Spectrum Ecology, 2019) - vegetation types within the application area are highlighted)

Vegetation Community	Broad Floristic Formation (NVIS III)	Vegetation Description (NVIS V)	Landform	Image
CLP-EW1 308 ha (80%)	<i>Eucalyptus</i> open woodland	<i>Eucalyptus griffithsii</i> and <i>E. transcontinentalis</i> sparse woodland over <i>Acacia hemiteles</i> and <i>Exocarpos aphyllus</i> tall shrubland over <i>Scaevola spinescens</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i> , <i>Olearia muelleri</i> and <i>Ptilotus obovatus</i> var <i>obovatus</i> low shrubland.	Clay/loam plain.	
CLP-EW2 32 ha (8%)	<i>Eucalyptus</i> open woodland	<i>Eucalyptus salmonophloia</i> sparse woodland over <i>Acacia hemiteles</i> and <i>Eremophila scoparia</i> tall open shrubland over <i>Atriplex nummularia</i> and <i>A. vesicaria</i> open chenopod shrubland over <i>Frankenia setosa</i> , <i>Maireana erioclada</i> and <i>Olearia muelleri</i> low open shrubland.	Clay/loam plain.	

Vegetation Community	Broad Floristic Formation (NVIS III)	Vegetation Description (NVIS V)	Landform	Image
HS-EW1 39 ha (10%)	<i>Eucalyptus</i> open woodland	<i>Eucalyptus torquata</i> and <i>E. clelandiorum</i> woodland over <i>Acacia colletioides</i> , <i>Eremophila interstans</i> subsp. <i>interstans</i> and <i>Allocasuarina campestris</i> tall open shrubland over <i>Acacia erinacea</i> , <i>Trymalium myrtillus</i> subsp. <i>myrtillus</i> and <i>Westringia rigida</i> open shrubland and <i>Triodia scariosa</i> sparse hummock grassland/ <i>Olearia muelleri</i> and <i>Ptilotus obovatus</i> . var <i>obovatus</i> low sparse shrubland.	Hillslope	

(Botanica, 2021a)

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D.2. Potentially occurring conservation significant flora

Conservation significant fauna assessed by Botanica (2021a) for their potential to occur in the application area are presented in the extracts below.

Species	Rank	Habitat	Comments	Likelihood
<i>Conostylis lepidospermoides</i>	T (EN)	Grey or yellow-brown sand over laterite.	Outside known range of species.	Unlikely
<i>Gastrolobium graniticum</i>		Sand, sandy loam, granite. Margins of rock outcrops, along drainage lines.	Outside known range of species.	Unlikely
<i>Thelymitra stellata</i>		Sand, gravel, lateritic loam.	Outside known range of species.	Unlikely
<i>Acacia coatesii</i>	P1	-	Outside known range of species.	Unlikely
<i>Acacia epedunculata</i>		Yellow sand. Sandplains.	Outside known range of species.	Unlikely
<i>Acacia sclerophylla</i> var. <i>teretiuscula</i>		Clay & loamy soils.	Outside known range of species.	Unlikely
<i>Acacia websteri</i>		Red sand, clay or loam. Low-lying areas, flats.	At extreme of range, habitat unlikely to be present.	Unlikely
<i>Austrostipa</i> sp. Carlingup Road (S. Kern & R. Jasper LCH 18459)		Rocky basalt hillslopes and crests.	Outside known range of species.	Unlikely
<i>Dampiera plumosa</i>		Red sandy soils.	Outside known range of species.	Unlikely
<i>Eucalyptus websteriana</i> subsp. <i>norsemanica</i>		Rocky rises.	Outside known range of species.	Unlikely
<i>Lepidosperma</i> sp. Parker Range (N. Gibson & M. Lyons 2094)		-	Outside known range of species.	Unlikely
<i>Melichrus</i> sp. Coolgardie (K.R. Newbey 8698)		-	Outside known range of species.	Unlikely
<i>Phebalium appressum</i>		Yellow sandplain.	Extreme of known range, habitat unlikely to be present.	Unlikely
<i>Philotheca pachyphylla</i>		Sand, red loam, clay loam. Sandplains, hill tops.	Outside known range of species.	Unlikely
<i>Ptilotus chortophytus</i>		-	Outside known range of species.	Unlikely
<i>Ptilotus procumbens</i>		Red clay.	Outside known range of species.	Unlikely
<i>Ptilotus rigidus</i>		-	At extreme of range.	Unlikely
<i>Rhodanthe uniflora</i>		Brown earth. Open eucalyptus woodland.	Within species range, habitat may be present.	Possible
<i>Thryptomene planiflora</i>		-	Outside known range of species.	Unlikely
<i>Thryptomene</i> sp. Coolgardie (E. Kelso s.n. 1902)		-	Outside known range of species.	Unlikely
<i>Austrostipa</i> sp. Dowerin (G. Wiehl F 8004)		-	Outside known range of species.	Unlikely
<i>Elachanthus pusillus</i>		-	Sparse regional records.	Unlikely
<i>Eremophila praecox</i>		Red/brown sandy loam. Undulating plains.	Within known range of species, habitat may be present.	Possible
<i>Eucalyptus educta</i>	P2	Shallow soils. Granite rocks.	Within known range, habitat may be present.	Possible
<i>Goodenia salina</i>		Low gypseous dunes near salt pans.	Outside known range of species.	Unlikely
<i>Hakea rigida</i>		Sandy soils, yellow sand.	Outside known range of species.	Unlikely
<i>Lepidium merrallii</i>		Clay loam.	Outside known range of species.	Unlikely

Species	Rank	Habitat	Comments	Likelihood
<i>Phebalium clavatum</i>		Sandy soils. Sandplains.	Outside known range of species.	Unlikely
<i>Acacia crenulata</i>		Clay, sandy clay, yellow sand. Rocky rises, granite outcrops, breakaways.	Outside known range of species.	Unlikely
<i>Allocasuarina eriochlamys</i> subsp. <i>grossa</i>		Stony loam, laterite clay. Granite outcrops.	Outside known range of species.	Unlikely
<i>Alyxia tetanifolia</i>		Sandy clay, loam, concretionary gravel. Drainage lines, near lakes.	Habitat unlikely to be present.	Unlikely
<i>Angianthus prostratus</i>		Red clay or loamy soils. Saline depressions.	Habitat unlikely to be present.	Unlikely
<i>Atriplex lindleyi</i> subsp. <i>conduplicata</i>		Crabhole plains.	Habitat unlikely to be present.	Unlikely
<i>Austrostipa blackii</i>		-	Outside known range of species.	Unlikely
<i>Chrysocephalum apiculatum</i> subsp. <i>norsemannense</i>		-	Outside known range of species.	Unlikely
<i>Cyathostemon verrucosus</i>		Slopes of Red Hill, Kambalda	Outside known range of species.	Unlikely
<i>Eremophila veronica</i>		Stony clay, clay loam. Lateritic breakaways.	Outside known range of species.	Unlikely
<i>Gompholobium cinereum</i>	P3	Yellow sand, clayey sand, brown loam, sandy gravel, laterite. Well-drained open sites, slopes, plains, roadsides.	Outside known range of species.	Unlikely
<i>Grevillea georgeana</i>		Stony loam/clay. Ironstone hilltops & slopes.	Outside known range of species.	Unlikely
<i>Isolepis australiensis</i>		Silty sand, sandy clay. Lake margins, pools.	Outside known range of species.	Unlikely
<i>Lepidium fasciculatum</i>		-	Sparse regional records.	Unlikely
<i>Melaleuca coccinea</i>		Sandy loam over granite. Granite outcrops, sandplain, river valleys.	Outside known range of species.	Unlikely
<i>Notisia intonsa</i>		Red sand, disturbed areas.	Within known range of species, habitat may be present.	Possible
<i>Phlegmatospermum eremaeum</i>		Stony loam.	Widespread but sparse records in region.	Unlikely
<i>Rinzia triplex</i>		-	Outside known range of species.	Unlikely
<i>Styphelia saxicola</i>		-	Outside known range of species.	Unlikely
<i>Eremophila caerulea</i> subsp. <i>merrallii</i>		Sand, clay or loam. Undulating plains.	Outside known range of species.	Unlikely
<i>Eucalyptus jutsonii</i> subsp. <i>jutsonii</i>	P4	Red to pale orange deep sands. Undulating areas and on dunes.	Outside known range of species.	Unlikely
<i>Eucalyptus x brachyphylla</i>		Sandy loam. Granite outcrops.	Outside known range of species.	Unlikely
<i>Frankenia glomerata</i>		White sand.	Outside known range of species.	Unlikely

(Botanica, 2021a)

Likelihood	Status	Family	Species	Distance from Study Area (km)	Habitat	WA Herb	Source TPFL	Reports Phoenix
Recorded	3	Casuarinaceae	<i>Allocasuarina eriochlamys</i> subsp. <i>grossa</i>	1	Red clay and laterite.	2	-	1
Recorded	1	Montiaceae	<i>Calandrinia</i> sp. <i>?leptrochloides/quartzitica</i>	<1	Red Sandy ecotone	-	-	2
Recorded	1	Scrophulariaceae	<i>Eremophila praecox</i>	<1	Low plain, red-brown sandy loam.	6	10	2
High	SOI	Montiaceae	<i>Calandrinia</i> sp. <i>Gypsum</i>	<1	Floodplain with chenopod shrubland on sandy/loamy clay	-	-	1
High	4	Myrtaceae	<i>Eucalyptus jutsonii</i> subsp. <i>jutsonii</i>	12	Red sandy soil.	3	-	-
High	3	Poaceae	<i>Austrostipa blackii</i>	<1	Basalt or BIF with red-brown deep sandy clay loam soils	1	-	1
Medium	3	Asteraceae	<i>Chryscephalum apiculatum</i> subsp. <i>norsemanense</i>	19	Red sand.	1	-	-
Medium	2	Asteraceae	<i>Elachanthus pusillus</i>	22	Unknown	1	-	-
Medium	1	Asteraceae	<i>Rhodanthe uniflora</i>	31	Brown earth. Open eucalyptus woodland.	1	-	-
Medium	3	Asteraceae	<i>Notisia intonsa</i>	3	Red-brown sandy loam- light clay. Lake shore saline soils	8	2	-
Medium	3	Brassicaceae	<i>Phlegmatospermum eremaeum</i>	19	Stony loam.	1	-	-
Medium	1	Fabaceae	<i>Acacia websteri</i>	20	Flat, lateritic soil in red clay sand.	13	5	-
Medium	T	Fabaceae	<i>Gastrolabium graniticum</i>	19	Granite rocks in red sand	33	2	-
Medium	T	Haemodoraceae	<i>Conostylis lepidospermoides</i>	14	Grey or yellow-brown sand over laterite	1	-	-
Medium	1	Myrtaceae	<i>Thryptomene</i> sp. <i>Londonberry (R.H. Kuchel 1763)</i>	19	Orange - brown stony to sandy loams. Sandy flats.	11	-	-
Medium	4	Scrophulariaceae	<i>Eremophila caerulea</i> subsp. <i>merrallii</i>	11	Sand, clay or loam. Undulating plains	1	-	-
Low	1	Amaranthaceae	<i>Ptilotus chortophytus</i>	22	Quartz outcrop	2	-	-
Low	1	Amaranthaceae	<i>Ptilotus procumbens</i>	24	Deep red clay.	1	-	-
Low	3	Apocynaceae	<i>Alyxia tetanifolia</i>	18	Sandy clay, loam, concretionary gravel. Drainage lines, near lakes	4	1	-
Low	3	Asteraceae	<i>Angianthus prostratus</i>	32	Red loamy soil	3	-	-
Low	3	Brassicaceae	<i>Lepidium fasciculatum</i>	23	Dry lake bed. Flat. Soil red loam.	2	-	-
Low	2	Brassicaceae	<i>Lepidium merrallii</i>	19	Ridge/slope. Well-drained. Dry brown clay loam over granite. 10-30% of loose rock on soil surface.	1	-	-
Low	3	Chenopodiaceae	<i>Atriplex lindleyi</i> subsp. <i>conduplicata</i>	27	By lake.	1	-	-
Low	3	Cyperaceae	<i>Eleocharis papillosa</i>	50	Winter wet claypan. Red brown clay loam.	1	-	-
Low	3	Cyperaceae	<i>Isoplepis australiensis</i>	25	Plain. Seasonally wet red clay soils. Low lying damp area.	1	-	-
Low	1	Cyperaceae	<i>Lepidosperma</i> sp. <i>Parker Range (N. Gibson & M. Lyons 2094)</i>	29	Unknown	1	-	-
Low	3	Ericaceae	<i>Styphelia</i> sp. <i>Bullfinch (M. Hislop 3574)</i>	36	Red brown loamy clay. Granite rocks with occasional quartz ground cover	2	-	-
Low	1	Ericaceae	<i>Melichrus</i> sp. <i>Coolgardie (K.R. Newbey 8698)</i>	36	Yellow sandplain.	3	-	-
Low	1	Euphorbiaceae	<i>Ricinacarpus</i> sp. <i>Eastern Goldfields (A. Williams 3)</i>	34	Yellow sand	1	-	-

Likelihood	Status	Family	Species	Distance from Study Area (km)	Habitat	WA Herb	Source TPFL	Reports Phoenix
Low	1	Fabaceae	<i>Acacia coatesii</i>	25	Skeletal red loam, Laterite/quartz, green stone ridge. Flat to gentle slope- low rocky hill	5	-	-
Low	3	Fabaceae	<i>Acacia crenulata</i>	32	Flat plain with red brown sandy loam - clay loam soil	6	2	-
Low	3	Fabaceae	<i>Acacia cylindrica</i>	39	Flat sandplain with very few laterite/quartz fine gravel on deep yellow sandy soil.	1	-	-
Low	1	Fabaceae	<i>Acacia epedunculata</i>	42	Yellow sand on sandplain.	8	4	-
Low	1	Fabaceae	<i>Acacia sclerophylla</i> var. <i>teretiuscula</i>	30	Clay and loamy soils	1	-	-
Low	3	Fabaceae	<i>Gompholobium cinereum</i>	6	Gentle undulations, yellow sand over laterite.	1	1	-
Low	4	Frankeniaceae	<i>Frankenia glomerata</i>	22	Saline depression. White sand.	1	-	-
Low	1	Goodeniaceae	<i>Dampiera plumosa</i>	28	Red sandy soils.	1	-	-
Low	2	Goodeniaceae	<i>Goodenia salina</i>	25	Flat drainage system. Red sandy clay loam over low gypseous sandy rise.	1	-	-
Low	4	Haloragaceae	<i>Myriophyllum petraeum</i>	45	Granitic silty sand. Floor of small ephemeral pool on granite bedrock exposure, water 10-12 cm deep	2	1	-
Low	3	Myrtaceae	<i>Calytrix creswellii</i>	44	Flat sandplain of deep yellow sandy soil.	1	-	-
Low	3	Myrtaceae	<i>Cyathostemon verrucosus</i>	23	Unknown	1	-	-
Low	2	Myrtaceae	<i>Eucalyptus educta</i>	10	Rocky Granite slope and gullies. Brown loam	4	-	-
Low	1	Myrtaceae	<i>Eucalyptus websteriana</i> subsp. <i>norsemanica</i>	29	Hill. Rocky, greenstone, metamorphosed basalt.	2	-	-
Low	4	Myrtaceae	<i>Eucalyptus</i> x <i>brachyphylla</i>	22	Granite rocks.	1	-	-
Low	3	Myrtaceae	<i>Hysterobaeckea ochropetala</i> subsp. <i>cometes</i>	46	Flat plain. Soil red sandy loam.	2	-	-
Low	3	Myrtaceae	<i>Melaleuca coccinea</i>	24	Sandy loam over granite. Granite outcrops, sandplain, river valleys	1	-	-
Low	3	Myrtaceae	<i>Rinzia triplex</i>	42	Plain. Red-brown Yellow sandy clay loam with lateritic gravel.	3	-	-
Low	1	Myrtaceae	<i>Thryptomene</i> sp. <i>Coolgardie (E. Kelso s.n. 1902)</i>	19	Unknown	2	-	-
Low	3	Parmeliaceae	<i>Xanthoparmelia dayana</i>	35	Laterite outcrops. On laterite pebbles.	3	-	-
Low	1	Parmeliaceae	<i>Xanthoparmelia subbarbatica</i>	34	Growing on rocks. Ridgetop with greenstone rubble on surface.	1	-	-
Low	1	Poaceae	<i>Austrostipa</i> sp. <i>Carlingup Road (S. Kern & R. Jasper LCH 18459)</i>	29	Basalt with red-brown shallow sandy clay soils	3	-	-
Low	2	Poaceae	<i>Austrostipa</i> sp. <i>Dowerin (G. Wiehl F 8004)</i>	30	Basalt with red-brown shallow sandy clay loam soils.	2	-	-
Low	2	Polygonaceae	<i>Rumex crystallinus</i>	27	Moist soil near water.	1	-	-
Low	3	Proteaceae	<i>Grevillea georgeana</i>	23	Top of sand dune. Yellow sand.	1	1	-
Low	2	Proteaceae	<i>Hakea rigida</i>	10	Sandy soils, yellow sand	1	-	-
Low	1	Rutaceae	<i>Philotheca pachyphylla</i>	36	Sand, red loam, clay loam. Sandplains, hill tops	6	-	-
Low	1	Rutaceae	<i>Phebalium appressum</i>	8	Yellow-brown sand-loam. Sandplain	2	-	-

Likelihood	Status	Family	Species	Distance from Study Area (km)	Habitat	Source		
						WA Herb	TPFL	Reports Phoenix
Low	2	Rutaceae	<i>Phebalium clavatum</i>	35	Sandplain, red/brown loamy sand over granite.	10	2	-
Low	3	Scrophulariaceae	<i>Diocirea acutifolia</i>	42	Flat of red/brown clay loam	1	-	-
Low	3	Scrophulariaceae	<i>Diocirea microphylla</i>	34	Plain to gentle slope. Red brown clay loam.	11	-	-
Low	3	Scrophulariaceae	<i>Eremophila veronica</i>	21	Stony clay, clay loam. Lateritic breakaways. Partly disturbed area/ drainage area	9	-	-
Low	1	Scrophulariaceae	<i>Eremophila xanthalaema</i>	44	Slope. Brown/red rocky loam/granite.	3	-	-

(Spectrum Ecology, 2019)

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D.3. Potentially occurring conservation significant fauna

Conservation significant fauna assessed by Botanica (2021a) and Spectrum Ecology (2019) for their potential to occur in the application area are presented in the extracts below.

Likelihood of Occurrence	Species	Conservation Status			Preferred habitats	Previous Records
		EPBC Act	WC/BC Act	DBCA		
Mammals						
Low The species is locally extinct in the region and the species is unlikely to occur.	Numbat (<i>Myrmecobius fasciatus</i>)	EN	EN	-	Eucalypt forests and woodlands, dominated by <i>Eucalyptus marginata</i> , <i>E. calophylla</i> and <i>E. wandoo</i> .	One record was made from Kalgoorlie (NatureMap). Two historical records from Kalgoorlie (Threatened Fauna Database).
Low Very limited and only historical records from the surrounding region. The species is known to be locally extinct in the region.	Greater Bilby (<i>Macrotis lagotis</i>)	VU	VU	-	Variety of habitats on soft soil including spinifex hummock grassland, acacia shrubland, open woodland and cracking clays.	Six historic records from Kalgoorlie and Kanowna (Threatened Fauna Database). No other records from the vicinity.
Low Although suitable woodland habitat exists within to the study areas, no records have been made in the surrounding area.	Chuditch, Western Quoll (<i>Dasyurus geoffroii</i>)	VU	VU	-	Sclerophyll forest, riparian forest, dry woodland, heath and mallee shrubland.	Protected Matter Search Tool (PMST) lists habitat to potentially be present within the study areas. Historical records from within 90 km of the study areas.
Low The study areas are outside the species' distribution. Highly unlikely to occur.	Western False Pipistrelle (<i>Falsistrellus mackenziei</i>)	-	-	P4	Sclerophyll forest of Karri, Jarrah and Tuart. Lives in old trees, branches and stumps.	A dead specimen was found in 2013 in Kalgoorlie. The species occurs in coastal regions of the south-west WA. Study areas are outside the species' range and no other records exist in the region.
Birds						
High Numerous records in close proximity of the study areas. Suitable habitat present, in particular at TSF Area and patches within the Rayjax study area.	Malleefowl (<i>Leipoa ocellata</i>)	VU	VU	-	Semi-arid and arid habitats. Variety of Mallee woodlands and shrublands.	Over 100 historic and recent records within 40 km of the study areas (DBCA, NatureMap 2019, Phoenix 2018).

Likelihood of Occurrence	Species	Conservation Status			Preferred habitats	Previous Records
		EPBC Act	WC/BC Act	DBCA		
Medium Four recent records (2016-2018) made from Kalgoorlie; however, study areas lie on the edge of the species' current range. Suitable habitat is present throughout the study areas.	Carnaby's Cockatoo (<i>Calyptorhynchus latirostris</i>)	EN	EN	-	Breeding in tree hollows of Wandoo, Tuart, Jarrah, York gum, Karri and Marri. Foraging in woodlands, forests, riparian vegetation, heath and <i>Banksia</i> woodland as well as introduced species.	Recently recorded from Kalgoorlie. Study areas lie on the north-eastern border of the species' current range.
Medium Recorded from the region of the study areas. Foraging habitat is present, no breeding habitat was recorded from the study areas.	Peregrine Falcon (<i>Falco peregrinus</i>)	-	OS	-	Widespread; coastal cliffs, riverine gorges and wooded watercourses.	One record from Credo station (26 km north-west of Castle Hill).
Low No suitable habitat present within the study areas. Records are scarce in the region and limited to large inland wetlands.	Curlew Sandpiper (<i>Calidris ferruginea</i>)	CR	CR	-	Migratory/waterbird species are typically associated with coastal habitats. These species also inhabit inland ephemeral wetland habitat types when present.	Two records from saltlake habitat east and west of the study areas (Young River Station Lake & Kanowna). No other records in the vicinity.
Low No records in the area and habitat has not been recorded from the regional area. Species listed due to salt lake habitat present within the wider region (~100 km).	Night Parrot (<i>Pezoporus occidentalis</i>)	EN	EN	-	Most records from long unburnt <i>Triodia</i> grasslands and/or Chenopod shrublands featuring large dense clumps of vegetation.	No confirmed records in the area. Protected Matter Search Tool (PMST) lists habitat to potentially be present within the study areas.
Low The Fork-tailed Swift is highly nomadic and records are rare in the region. Records typically associated with suitable climatic conditions instead of habitat types.	Fork-tailed Swift (<i>Apus pacificus</i>)	M	M	-	Nomadic, almost entirely aerial lifestyle over a variety of habitats; associated with storm fronts.	Scattered records in the region but generally rarely recorded (NatureMap 2019).

Likelihood of Occurrence	Species	Conservation Status			Preferred habitats	Previous Records
		EPBC Act	WC/BC Act	DBCA		
Low No suitable habitat present within the study areas. Records are scarce in the region and limited to large inland wetlands.	Common Sandpiper (<i>Actitis hypoleucos</i>) Common Greenshank (<i>Actitis hypoleucos</i>) Sharp-tailed Sandpiper (<i>Calidris acuminata</i>) Wood Sandpiper (<i>Tringa glareola</i>) Ruddy Turnstone (<i>Arenaria interpres</i>) Red-necked Stint (<i>Calidris ruficollis</i>) Glossy Ibis (<i>Plegadis falcinellus</i>) Sanderling (<i>Calidris alba</i>) Grey-tailed Tattler (<i>Tringa brevipes</i>) Oriental Plover (<i>Charadrius veredrus</i>)	M	M	-	Migratory/waterbird species are typically associated with coastal habitats. These species also inhabit inland ephemeral wetland habitat types when present.	Several records from Kopai Lake, Rowles Lagoon, Young River Station Lake, Lake Douglas, Hannan Lake, and Kalgoorlie Sewerage Outlet. No other records from outside large lake or lagoon habitat.
Low No suitable habitat is present within the study areas. Two records in the region.	Hooded Plover (<i>Thinornis rubricollis</i>)	-	-	P4	Coastal areas and adjacent dunes. Also reefs, coastal lakes, and lagoons.	Two historical records from Arrow Lake from 1980 and 1992 (DBCA threatened fauna database).
Low	Blue-billed Duck (<i>Oxyura australis</i>)	-	-	P4	Wetland, inland lakes. Almost entirely aquatic lifestyle, rarely seen on land.	Records from Credo Station from 2015 (DBCA, NatureMap). No other

Likelihood of Occurrence	Species	Conservation Status			Preferred habitats	Previous Records
		EPBC Act	WC/BC Act	DBCA		
No suitable habitat is present within the study areas. Only one record in the region.						records within 100 km of the study area.
Invertebrates						
Medium Only historical records known from Lake Douglas; however, little is known about the species and suitable habitat is present at the study areas.	Arid Bronze Azure Butterfly (<i>Ogyris subterrestris petrina</i>)	CR	CR	-	Mallee Woodland and shrubland, hop-bush shrubland, often near flood plains. Associated with the sugar ant (<i>Camponotus terebrans</i>) at the base of smooth-barked trees and shrubs.	Known from only two locations, Barbalin NR in the Avon Wheatbelt (recent records) and from Lake Douglas (historical, 1911-1989), approx. 24 km south of the study areas. No other records exist in the area. Suitable habitat is present within study areas.
Medium Few records known to date from Lake Douglas; however, little is known about the species and suitable habitat is present at the study areas.	Inland Hairstreak (<i>Jaimeus aridus</i>)	-	-	P1	Larvae feeds on leaves and flowers of <i>Senna nemophila</i> and <i>Acacia tetragonophylla</i> . Adults remain close to breeding habitat.	Records are restricted to historical sightings in the 80s and 90s from Lake Douglas, approx. 24 km south of the study areas. No other records exist in the area. Suitable habitat is present within study areas.

Spectrum (2019)

Species	Conservation Status			Habitat Description	Assessment	Likelihood
	EPBC Act	BC Act	DBCA Priority			
Night Parrot <i>Pezoporus occidentalis</i>	EN	CR	-	Most habitat records are of <i>Triodia</i> (Spinifex) grasslands and/or chenopod shrublands in the arid and semi-arid zones, or <i>Astrelba</i> spp. (Mitchell grass), shrubby samphire and chenopod associations, scattered trees and shrubs, <i>Acacia aneura</i> (Mulga) woodland, treeless areas and bare gibber are associated with sightings of the species. Roosting and nesting sites are consistently reported as within clumps of dense vegetation, primarily old and large Spinifex (<i>Triodia</i>) clumps, but sometimes other vegetation types (DAWE, 2020b).	Would not occur. Very marginal habitat.	Would Not Occur
Carnaby's Cockatoo <i>Calyptrorhynchus latirostris</i>	EN	EN		Carnaby's Cockatoo is endemic to, and widespread in, the south-west of Western Australia. It occurs from the wheatbelt, in areas that receive between 300 and 750 mm of rainfall annually, across to wetter regions in the extreme south-west, including the Swan Coastal Plain and the southern coast. Its range extends from Cape Arid in the south-east to Kalbarri in the north, and inland to Hatter Hill, Gibb Rock, Narembene, Noongar, Wongan Hills, Nugadong, near Perenjori, Wilroy and Nabawa.	Would Not Occur. No documented records in the region.	Would Not Occur
Grey Falcon <i>Falco hypoleucos</i>	VU	VU		The Grey Falcon occurs at low densities across inland Australia. The species frequents timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined water courses. The species has been observed hunting in treeless areas and frequents tussock grassland and open woodland, especially in winter. While breeding Grey Falcons feed almost exclusively on birds. Prey species include doves, pigeons, small parrots and cockatoos and finches, but a variety of other bird prey species has been recorded. Non avian prey recorded by direct observation include small mammals and lizards.	Possibly Occurs. Survey area may form part of larger home range.	Possible
Malleefowl <i>Leipoa ocellata</i>	VU	VU	-	Scrublands and woodlands dominated by mallee and wattle species (DAWE, 2020b).	Possibly Occurs. Habitat likely marginal and unsuitable for breeding. Occasional transients only.	Possible
Fork-tailed Swift <i>Apus pacificus</i>	MI	MI	-	Low to very high airspace over varied habitat from rainforest to semi desert (Birdlife Australia, 2019).	Unlikely to occur. Very occasional transients only.	Unlikely

Migratory Shorebirds (Various species)	IA/MI	IA/MI	T-P4	Prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, salt pans and hypersaline salt lakes inland (DAWE, 2020b).	Habitat would not be present.	Would Not Occur
Grey Wagtail <i>Motacilla cinerea</i>	MI	MI	-	Running water in disused quarries, sandy, rocky streams in escarpments and rainforest, sewerage ponds, ploughed fields and airfields (Morecombe 2004).	Would Not Occur. No suitable habitat.	Would Not Occur
Peregrine Falcon <i>Falco peregrinus</i>	-	OS	-	The Peregrine Falcon is found in most habitats, from rainforests to the arid zone, and at most altitudes, from the coast to alpine areas. It requires abundant prey and secure nest sites, and prefers coastal and inland cliffs or open woodlands near water, and may even be found nesting on high city buildings (Birdlife Australia, 2018).	Possibly Occurs. Survey area may form part of larger home range but unlikely to breed in area	Possible
Numbat <i>Myrmecobius fasciatus</i>	EN	EN		Previously widespread in arid and semi-arid Australia, the species is now restricted to two isolated wild populations in south-west Western Australia and a number of translocations to predator proof locations.	Would Not Occur. No documented records in the region.	Would Not Occur
Chuditch, Western Quoll <i>Dasyurus geoffroii</i>	VU	VU		Previously occurred throughout arid and semi-arid Australia but is now restricted to south-west Western Australia. (DAWE, 2020b).	Unlikely to Occur. Considered to be locally extinct.	Unlikely
Bilby <i>Macrotis lagotis</i>	VU	VU		In Western Australia, it is mainly restricted to the Gibson Desert, Little Sandy Desert, Great Sandy Desert and parts of the Pilbara and Southern Kimberley.	Would Not Occur. No documented records in the region.	Would Not Occur

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D.4. Fauna habitat

Fauna habitats within the application area as mapped by Botanica (2021a) and Spectrum Ecology (2019) are presented in the extracts below.

Two fauna habitats were recorded from the Rayjax study area. Their extent is listed in Table 3.7 and shown in Map 3.11, and their details are described in the sections below.

Table 3.7: Fauna Habitat Types at the Rayjax Study Area

Habitat Type	Extent (ha)	% of Study Area	Associated Vegetation Type
Mixed Eucalypt Woodland	141.9	96.6	Veg type iv
Gentle Hillslope with Eucalypt Woodland	5.0	3.4	Veg type vi

3.3.2.1. Mixed Eucalypt Woodland

The Mixed Eucalypt Woodland was the most dominant habitat type throughout the Rayjax study area (Map 3.11). It covered 141.9 ha which represents 96.6% of the study area. The habitat type is characterised by a predominantly flat landscape. The vegetation comprised of a moderately open to dense woodland of *Eucalyptus salubris*, *E. delectiorum* and *E. salmonophloia* over an open layer of mixed lower shrubs of *Eremophila scoparia*, *Senna artemisioides*, *Atriplex* sp. and *Olearia muelleri*. The substrate consisted of brown sandy clay with leaf litter accumulated underneath trees and shrubs (Figure 3.6). Some pebbles (predominantly quartz) were present in some areas.



Figure 3.6: Mixed Eucalypt Woodland Habitat

3.3.2.2. Gentle Hillslope with Eucalypt Woodland

The Gentle Hillslope with Eucalypt Woodland was recorded from one location within the Rayjax Haul Road (Map 3.10). It covered 5.0 ha which represents 3.4% of the study area. a gentle hillslope dominated by a moderately open to dense woodland of *Eucalyptus moderata*, *E. oleosa* and *E. torquata* over an open layer of mixed lower shrubs of *Eremophila pustulata*, *E. interstans*, *Acacia erinacea*, *Senna artemisioides*, *Atriplex vesicaria* and *Cratystylis conocephala*. (Figure 3.7). The substrate consisted of clay with some pebbles and plenty of leaf litter and moderate wood litter.

Spectrum (2019)

Table 4-9: Terrestrial Fauna Habitats within the survey area

Fauna Habitat	Example Image
<u>Eucalyptus woodland on clay-loam plain</u> Area: 340 ha (88%)	
<u>Eucalyptus woodland on hillslope</u> Area: 39 ha (10%)	

Botanica (2021a)

Appendix E. Sources of information

E.1. GIS datasets

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

- 10 metre contours (DPIRD-073)
- 2 metre contours (DPIRD-072)
- Bush Forever Areas 2000 (DPLH-019)
- Clearing Instruments Activities (Areas Approved to Clear) (DWER-076)
- Clearing Instruments Conditions (Areas Subject to Conditions) (DWER-077)
- Clearing Instruments Proposals (Areas Applied to Clear) (DWER-075)
- Clearing Referral Proposal (DWER-116)
- Clearing Regulations - Environmentally Sensitive Areas (DWER-046)
- Clearing Regulations - Schedule One Areas (DWER-057)
- Contaminated Sites Database - Restricted (DWER-073)
- DBCA - Lands of Interest (DBCA-012)
- DBCA - Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia - Western Australia (DBCA-045)
- EPA Redbook Recommended Conservation Reserves 1976-1991 (DBCA-029)
- EPP Goldfields Residential Areas Sulphur Dioxide 2003 (DWER-063)
- Groundwater Salinity Statewide (DWER-026)
- Hydrographic Catchments - Basins (DWER-027)
- Hydrographic Catchments - Catchments (DWER-028)
- IBRA Vegetation Statistics
- IBSA Survey Details (DWER-118)
- Local Government Area (LGA) Boundaries (LGATE-233)
- Localities (LGATE-234)
- Medium Scale Topo Contour (Line) (LGATE-015)
- Medium Scale Topo Elevation (Point) (LGATE-014)
- Medium Scale Topo Inland Flat (Polygon) (LGATE-099)
- Medium Scale Topo Water (Line) (LGATE-018)
- Medium Scale Topo Water (Point) (LGATE-017)
- Medium Scale Topo Water (Polygon) (LGATE-016)
- Native Title (Determination) (LGATE-066)
- Native Title (Fed Court) (LGATE-005)
- Native Title (ILUA) (LGATE-067)
- Native Title (NNTT) (LGATE-004)
- Native Vegetation Extent (DPIRD-005)
- Pre-European Vegetation (DPIRD-006)
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Reserves (LGATE-227)
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Rivers (DWER-036)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Mapping - Best Available (DPIRD-027)
- South Coast Significant Wetlands (DBCA-018)
- Surface Water Management Areas (DWER-041)
- Surface Water Management Subareas (DWER-042)
- Townsites (LGATE-248)
- WA Now Aerial Imagery
- Wild Rivers (DWER-087)
- WRIMS - Groundwater Areas (DWER-085)
- WRIMS - Surface Water Areas (DWER-082)

Restricted GIS Databases used:

- Black Cockatoo Baudin's Distribution
- Black Cockatoo Forest Red Tail Distribution
- Black Cockatoo Carnaby's Distribution
- Threatened and Priority Flora (TPFL)
- Threatened and Priority Flora (WAHerb)
- Threatened and Priority Fauna
- Threatened and Priority Ecological Communities
- Threatened and Priority Ecological Communities (Buffers)

E.2. References

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Glossary

Acronyms:

BC Act	<i>Biodiversity Conservation Act 2016</i> , 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)
DCCEEW	Department of Climate Change, Energy, the Environment and Water, Australian Government
DBCA	Department of Biodiversity, Conservation and Attractions, Western Australia
DEMIRS	Department of Energy, Mines, Industry Regulation and Safety (now DMPE)
DER	Department of Environment Regulation, Western Australia (now DWER)
DMIRS	Department of Mines, Industry Regulation and Safety, Western Australia (now DMPE)
DMP	Department of Mines and Petroleum, Western Australia (now DMPE)
DMPE	Department of Mines, Petroleum and Exploration
DoEE	Department of the Environment and Energy (now DCCEEW)
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	<i>Environmental Protection Act 1986</i> , Western Australia

EPA	Environmental Protection Authority, Western Australia
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth 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 (2023) Conservation Codes for Western Australian Flora and Fauna. Department of Biodiversity, Conservation and Attractions, Western Australia:

Threatened species

T 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 the species of fauna that are listed as critically endangered, endangered or vulnerable threatened species.

Threatened flora is the species of flora that are listed as critically endangered, endangered or vulnerable threatened species.

The assessment of the conservation status of threatened species is in accordance with the BC Act listing criteria and the requirements of [Ministerial Guideline Number 1](#) and [Ministerial Guideline Number 2](#) that adopts the use of the International Union for Conservation of Nature (IUCN) [Red List of Threatened Species Categories and Criteria](#), and is based on the national distribution of the species.

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.

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.

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.

Extinct species

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.

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).

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.

Specially protected species

SP 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).

Migratory species include birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) or 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.

CD Species of special conservation interest (conservation dependent fauna)

Species of special conservation need that are 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).

Currently only fauna are listed as species of special conservation interest.

OS Other specially protected species

Species 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).

Currently only fauna are listed as species otherwise in need of special protection.

Priority species**P Priority species**

Priority is not a listing category under the BC Act. The Priority Flora and Fauna lists are maintained by the department and are published on the department's website.

All fauna and flora are protected in WA following the provisions in Part 10 of the BC Act. The protection applies even when a species is not listed as threatened or specially protected, and regardless of land tenure (State managed land (Crown land), private land, or Commonwealth land).

Species that may possibly be threatened species that do not meet the criteria for listing under the BC Act because of insufficient survey 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 prioritisation for survey and evaluation of conservation status so that consideration can be given to potential listing as threatened.

Species that are adequately known, meet criteria for near threatened, or are rare but not threatened, or that have been recently removed from the threatened species list or conservation dependent or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of priority status 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 – known from few locations, none on conservation lands

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, for example, 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 for threatened listing and appear to be under immediate threat from known threatening processes. These species are in urgent need of further survey.

P2 Priority Two - Poorly-known species – known from few locations, some on conservation lands

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, for example, 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 for threatened listing and appear to be under threat from known threatening processes. These species are in urgent need of further survey.

P3 Priority Three - Poorly-known species – known from several locations

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. These species need 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 a conservation dependent specially protected species.
- (c) Species that have been removed from the list of threatened species or lists of conservation dependent or other specially protected species, during the past five years for reasons other than taxonomy.
- (d) Other species in need of monitoring.

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.