

Basic Fauna, Targeted Black Cockatoo, and Western Ringtail Possum Habitat Assessment

Bridge 3923 Replacement and Side Track Mordalup Road (2130171) EOS # 2416

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V2

On behalf of:
Main Roads Western Australia
South West Region



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SUMMARY

This report details the results of a basic fauna, targeted black cockatoo, and western ringtail possum habitat assessment around Bridge 3923 on Mordalup Road between 9.03 and 9.39 straight line kilometre (SLK) in the Shire of Manjimup (the survey area).

Main Roads requires a fauna survey to delineate key fauna and potential sensitivity to impact from the proposal. The outcome of the survey and information supplied in the fauna survey report will be used to inform the environmental assessment and approvals process. The results of the fauna survey may also assist in the preparation of Environmental Impact Assessment documentation.

The assessment has included a literature review and a daytime reconnaissance survey. Field work at the site was carried out on 18 and 19 July December 2022. All survey work and reporting has been carried out by Greg Harewood (Zoologist).

Key Findings

The 1.7 ha survey area contains four broad scale habitat units, three of which are primarily based on vegetation composition as defined by Ecoedge (2022). Just over half (0.92 ha ~53%) of the survey area contains an open forest of jarrah, marri and flooded gum over a tall open shrubland/shrubland of various species. A low woodland of paperbark and banksia over a tall open shrubland/shrubland and forbland, which makes up about 0.21 ha (12%) of the survey area, borders a 64 metre section of the Tone River. The balance of the survey area (0.61 ha ~35%) is represented by cleared land including the existing road pavement.

To put this small area of vegetation into perspective there is approximately 100,000 ha of remnant native vegetation within 20 km of the survey area (DPIRD 2022).

With respect to fauna habitat values, the majority of the vegetation appears to be in good to very good condition and would therefore have the capacity to support a range of native fauna species known to frequent the wider area. The small size of the survey area and the limited range of habitat types would however limit the overall fauna biodiversity. The fact that vegetation within the survey area is continuous with the Tone River Nature Reserve and extensive areas of state forest increases the probability that some species which would otherwise not persist may at least occasionally be present.

The black cockatoo habitat tree assessment identified 30 trees within the survey area with a DBH of >50cm. Most of these trees (23) appeared to not contain hollows of any size and were therefore placed in MRWA Category 7. Seven (7) trees contained apparent or obvious hollows, all of which were assessed as being unlikely to be suitable for black cockatoos to currently use for nesting purposes, due to the hollows apparent small size, unsuitable orientation and/or low height above ground level. These trees were placed in MRWA Category 6.

Evidence of black cockatoos foraging within the survey area was found in the form of chewed marri fruits at a number of locations. All the evidence was attributed to the forest red-tailed black cockatoo based on the nature of the foraging activity.

Vegetation within the survey area has been assessed as being of low foraging value to all three species of black cockatoo (Total Score 0, 1 or 4 out of 10). The low foraging value scores can largely be attributed to the limited extent of native vegetation present (<0.1% of the vegetation within 12km) and the paucity/absence of preferred foraging species in nearly 50% of the survey area.

No evidence of black cockatoos roosting within trees located within the survey area was observed during the survey period.

The only evidence of western ringtail possum observed during the day survey was a single old scat found at the base of a jarrah tree in the south-west section of the survey area. The lack of evidence of the species presence suggest that it occurs in the area in relatively low densities. It has been concluded that only a few individuals, if any would be present at any one time.

Fifteen fauna species (mainly common bird species) were observed or secondary evidence of their presence recorded during the field survey. In summary five vertebrate fauna species of conservation significance were positively identified as utilising the survey area:

- Forest Red-tailed Black Cockatoo – Vulnerable (WA/Federal);
- Baudin’s Black Cockatoo – Endangered (WA/Federal);
- Western Ringtail Possum – Critically Endangered (WA/Federal);
- Chuditch - Vulnerable (WA/Federal);
- Woylie – Critically Endangered (WA)/Endangered (Federal).

Several additional species of conservation significance may also utilise the survey area, though, as no evidence of their presence was identified during the field survey, their status in the area remains uncertain:

- Carnaby’s Cockatoo – Endangered (WA/Federal);
- Muir’s Corella - CD (WA);
- Peregrine Falcon – OS (WA);
- Masked Owl – Priority 3 (WA Priority Species);
- Carnaby’s Black Cockatoo – Endangered (WA/Federal);
- South-western Brush-tailed Phascogale - CD (WA);
- Quenda - Priority 4 (WA Priority Species);
- Western Brush Wallaby - P4 (WA Priority Species);
- Tammar - P4 (WA Priority Species);

- Western False Pipistrelle – Priority 4 (WA Priority Species);
- Water Rat *Hydromys chrysogaster* – P4 (WA Priority Species).

The specific nature of the proposed road works has not been finalised and therefore it is difficult to determine likely impacts. In cases where some habitat is present and available information indicates at least some probability of the species occurrence, likely impacts are anticipated to most likely be related to the loss of a small area of habitat and the potential for some species to be killed or injured during clearing. This in particular relates to those species that utilise hollow bearing trees for daytime refuge and some ground-based species that seek daytime refuge in burrows, fallen hollow logs/log piles or dense undergrowth.

Management of actions that will affect fauna and fauna habitat will therefore be required to minimise any potential impacts to acceptable levels. Potential impacts on fauna should be reviewed as planning progresses.

1. INTRODUCTION

This report details the results of a basic fauna, targeted black cockatoo, and western ringtail possum habitat assessment around Bridge 3923 on Mordalup Road between 9.03 and 9.39 straight line kilometre (SLK) in the Shire of Manjimup (the survey area) (Figures 1 & 2).

The bridge works will involve constructing a new structure to the following specifications:

- Width between kerbs 7.2 metre (m) (2x 3 m lanes; 2x 0.6 m shoulders).
- Total width including kerbing is 8.04 m.
- Existing road centreline will be maintained. This means approximately 2 m widening on either side of the existing bridge, to an overall width of 4 m.
- New bridge length will be similar to the existing structure.
- Side-track (true RHS) will need to be constructed to maintain traffic flow during construction. The side track will include installation of temporary bridge on temporary abutments. The side-track must be a distance of at least 5 m clearance from the edge of the proposed bridge construction area.
- Side-track (true LHS) may need to be constructed for construction purposes to move material and equipment. Proposed construction includes fill and pipes with works carried out outside of the winter period.

Main Roads required the fauna survey to delineate key fauna and potential sensitivity to impact from the proposal. The outcome of the survey and information supplied in the fauna survey report will be used to inform the environmental assessment and approvals process. The results of the fauna survey may also assist in the preparation of Environmental Impact Assessment documentation.

2. SCOPE OF WORKS

Survey area

The desktop study area has been defined as the zone within a 20 km radius of proposal area. The field survey area is a zone around the existing bridge and has an extent of about 1.7 ha in addition to about 0.5 ha of proposed temporarily side tracks required during construction (exact location/area TBA).

The survey area occurs on Shire of Manjimup managed land, which is bounded by the Tone – Perup Nature Reserve, the Tone State Forest and agricultural land.

Desktop Assessment

- Complete a desktop assessment of the study area prior to the field survey work to identify all significant fauna constraints, which may be in, or nearby the survey area. Desktop assessment to include presentation and review of data from the BirdLife Australia's Atlas and Birddata datasets, Atlas of Living Australia database, Index of Biodiversity Surveys for Assessment database, DCCEEW Protected Matters Database, DBCA's NatureMap, and Main Roads supplied database searches from DBCA's Species & Communities Branch (Threatened and Priority fauna). Where the survey includes black cockatoos, for each of the three threatened black cockatoo species relevant to the survey, include the locations of the nearest (i.e. within study area) confirmed and unconfirmed roosting and nesting sites.
- Identify background environmental information as per EPA guidance (2020) (e.g. IBRA bioregions and subregions, soil/land system, surface water and drainage, climate information and conservation estate (e.g. DBCA legislated lands, Bush Forever, State Forest)).

Field Survey

- Conduct a field survey as per EPA (2020) guidance to verify / ground truth the desktop assessment findings through a basic fauna, targeted black cockatoo and western ringtail possum habitat assessment survey.
- Undertake habitat assessment as per EPA guidance (2020). This includes undertaking habitat observation sites and habitat mapping. Assessment of aquatic/riparian habitat relevant to conservation significant species identified in desktop assessment to also be included.
- Habitat mapping should be based on vegetation units and the report should include a summary of which habitat types are suitable for each significant fauna considered likely or possible to occur, or fauna recorded in the survey area.
- Provide an inventory of all native and non-native fauna observed, based on sightings, scats, tracks and other evidence.
- Black Cockatoo Habitat Assessment
 - Identification and mapping of black cockatoo foraging habitat, roosting habitat and breeding habitat (trees with Suitable Diameter at Breast Height (DBH)) as per Commonwealth guidelines (2012). Trees to be mapped with a GPS with a 2 m accuracy. The number and size of hollows and signs of use to be recorded.
 - Black cockatoo hollow survey to include the following for hollows that are determined possibly suitable hollows:
 - estimate of hollow aperture size
 - depth of hollows

- angle of hollows
- Suitability/evidence of hollow use by black cockatoos with the use of a pole camera or drone or ladder and harness inspection methods
- Evidence of black cockatoo roosting habitat. Any trees identified during the survey as roosting in the field should be identified and mapped.
- An assessment of black cockatoo foraging habitat based on vegetation type, assemblages and condition. Evidence of feed residue will also be noted.
- Refer to Main Roads Black Cockatoo Impact Assessment Factsheet (D19#1011841) for further guidance (Appendix 2).
- Western Ringtail Possum (WRP)
 - Identification and mapping of western ringtail possum habitat including evidence of presence (dreys and scats).

Note: For the purposes of this proposal the term black cockatoo is in reference to Baudin's cockatoo *Zanda baudinii*, Carnaby's cockatoo *Zanda latirostris* and the forest red-tailed black cockatoo *Calyptorhynchus banksii naso*.

3. METHODS

3.1 LITERATURE REVIEW

3.1.1 BIOGEOGRAPHIC SETTING

The broad scale biogeographical setting of the survey area has been determined by undertaking a review of the Interim Biogeographic Regionalisation for Australia (IBRA) (version 7.0) document (Commonwealth of Australia 2016).

The IBRA represents a landscape based approach to classifying the land surface of Australia. 89 biogeographic regions and 419 sub regions have been delineated, each reflecting a unifying set of major environmental influences which shape the occurrence of flora and fauna and their interaction with the physical environment across Australia and its external territories (excluding Antarctica) (Commonwealth of Australia 2016).

3.1.2 FAUNA SPECIES OF CONSERVATION SIGNIFICANCE

A list of conservation significant fauna recorded or likely to occur within the survey area has been compiled by a review of available databases and literature including, but not limited to the following data sources:

- Department of Biodiversity, Conservation and Attractions (DBCA) Threatened Fauna Database (NatureMap) search (DBCA 2022). A 20 km buffer around the survey area was applied to capture previous fauna records within the immediate vicinity in addition to Main Roads supplied database searches from DBCA's Species & Communities Branch (Threatened and Priority fauna);

- *Environment Protection and Biodiversity Conservation Act 1999 (the EPBC Act)* Protected Matters database search for fauna of national environmental significance (DCCEEW 2023). The minimum buffer (0 km) was applied to this search as the databases contains distribution data (areas) and not actual fauna records;
- BirdLife Australia's Atlas, Birddata datasets, Atlas of Living Australia database; and
- Literature search and review of other fauna surveys in the vicinity.

The conservation status of each species has been based on current lists produced under Federal and State Acts (*EPBC Act* and the *Biodiversity Conservation Act 2016 (BC Act)*).

3.2 FIELD SURVEYS

The daytime field component of the fauna assessment was carried out on the 27 December 2022 by Greg Harewood (B.Sc. Zoology – 20 years' experience in field zoology in south west Western Australia).

3.2.1 FAUNA HABITAT ASSESSMENT

Vegetation units and soils identified by Ecoedge (2022) during a recent reconnaissance and targeted flora and vegetation survey have been used to define broad scale fauna habitats across the survey area. This information has been supplemented with observations made during the fauna site reconnaissance survey.

The main objective of the assessment was to determine if it were likely that species of conservation significance would utilise the habitats identified as occurring within the survey area based on their documented habitat preference and current known distribution.

3.2.2 BLACK COCKATOO HABITAT ASSESSMENT

The following methods were employed to comply with the defined scope of works and are based on Commonwealth of Australia (2012 and 2022) guidelines which state that surveys for Carnaby's, Baudin's and forest red-tailed black cockatoo habitat should:

- be done by a suitably qualified person with experience in vegetation or cockatoo surveys, depending on the type of survey being undertaken;
- maximise the chance of detecting the species' habitat and/or signs of use;
- determine the context of the site within the broader landscape—for example, the amount and quality of habitat nearby and in the local region (for example, within 10 km);
- account for uncertainty and error (false presence and absences); and
- include collation of existing data on known locations of breeding and feeding birds and night roost locations.

The Commonwealth of Australia (2012) places habitats used by black cockatoos into the following three categories:

- Breeding Habitat;
- Foraging Habitat; and
- Night Roosting Habitat.

3.2.2.1 Breeding Habitat Assessment

The black cockatoo breeding habitat assessment identified all suitable breeding tree species within the survey area that have a diameter at breast height (DBH) equal to or greater than 50cm. The DBH of each tree was estimated using a pre-made “caliper”.

Target tree species included marri (*Corymbia calophylla*), jarrah (*Eucalyptus marginata*), and flooded gum (*Eucalyptus rudis*) and any other *Corymbia/Eucalyptus* species of a suitable size that were present. Peppermints, *Banksia*, sheoak and *Melaleuca* tree species (for example) were not assessed as they typically do not develop hollows used by black cockatoos.

The location of each tree identified as being over the threshold DBH was recorded with a GPS and details on tree species, number and size of hollows (if any) noted. Trees observed to contain hollows (of any size/type) will be marked with “H” using spray paint.

Hollow/potential hollows were placed into one of four categories, based on the size of the apparent hollow entrance, these being:

- Small = ~<5cm diameter (i.e. entrance too small for a black cockatoo);
- Medium = ~5cm-10cm diameter (i.e. entrance too small for a black cockatoo);
- Large = ~>10cm diameter (entrance large enough for a black cockatoo but hollow appears unsuitable for nesting i.e. wrong orientation, appears too small, too low or too shallow); or
- Large (cockatoo) = ~>10cm diameter (entrance and apparent hollow appears big enough and suitably sized/orientated for a black cockatoo to use for nesting).

Based on this assessment, trees present within the survey area were placed into one of four categories:

- Tree <50cm DBH or an unsuitable species (these were not assessed/recorded);
- Tree \geq 50cm DBH, no hollows seen;
- Tree \geq 50cm DBH, one or more hollows seen, none of which were considered suitable for black cockatoos to use for nesting; or
- Tree \geq 50cm DBH, one or more hollows seen, with at least one considered suitable for black cockatoos to use for nesting.

For the purposes of this assessment, a tree containing a potential black cockatoo nest hollow was defined as:

Generally, any tree which is alive or dead that contains one or more visible hollows (cavities within the trunk or branches) or possible hollows potentially suitable for occupation by black cockatoo for the purpose of nesting/breeding. Hollows or possible hollows that had an entrance greater than about 10cm in diameter and would allow the entry of a black cockatoo into a suitably orientated and sized branch/trunk, were recorded as a “potential nest hollow”.

Identified hollows were examined using binoculars for evidence of actual use by black cockatoos (e.g. chewing around hollow entrance, scarring and scratch marks on trunks and branches). Details recorded included hollow size, height, type, orientation, comments on suitability and any evidence of use

Trees with possible nest hollows were also scratched and raked with a large stick in attempt to flush any sitting birds from hollows and calls of chicks were listened for. Where the assessment was inconclusive, and if possible, trees identified as having potential nest hollows were subsequently examined and photographed using a drone (DJI Mavic Air).

The habitat value according to the scoring system recommended by MRWA has been applied to each habitat tree (MRWA 2022).

A review of available literature was carried out to determine the location/extent of any known/likely black cockatoo breeding habitat areas in the vicinity of the survey area.

3.2.2.2 Foraging Habitat Assessment

Foraging habitat is represented by plant species that are known to provide a food source for black cockatoos. This can be in the form of seeds, flowers and also boring grubs that are extracted from some plant species.

The location and nature of black cockatoo foraging evidence (e.g. chewed fruits around base of trees) observed during the field survey was recorded. The nature and extent of potential foraging habitat present was also documented irrespective of the presence of any actual foraging evidence.

A review of available literature was carried out to determine the location/extent of any known/likely black cockatoo foraging habitat areas in the vicinity.

The assessment of foraging quality was then undertaken in accordance with the assessment methodology described within the DCCEEW offset calculator input for threatened species habitat, which considers:

- The vegetation composition, condition and structure of the foraging habitat (Score out of 3).
- The importance of the foraging habitat at a local scale (Score out of 3).
- Whether the species regularly forages within the habitat (Score out of 4).

The score generated using this model provides an indication of the overall foraging value (score out of ten) and can also be used as an input into the DCCEE offset calculator.

3.2.2.3 Night Roosting Habitat Assessment

Direct and indirect evidence of black cockatoos roosting within trees on site was noted where observed (e.g. branch clippings, droppings or moulted feathers).

A review of available literature was carried out to determine the location/extent of any known/likely black cockatoo roosting habitat areas in the vicinity.

3.2.3 WESTERN RINGTAIL POSSUM ASSESSMENT

A day time survey to locate and record dreys, obvious tree hollows, scats and individual WRPs was carried out concurrent with the field reconnaissance survey and involved a series of traverses on foot across the survey area. A nocturnal survey has not been carried out as it was not considered warranted at this point in time.

Description and comments on the amount and quality of WRP habitat within the survey area are provided based on observations made during the site survey.

3.2.4 FAUNA OBSERVATIONS

Evidence of the presence or likely presence of fauna species of conservation significance (or suitable habitat) was searched for and recorded concurrent with other site surveys. Opportunistic observations of all fauna species were made during all field survey work and recorded where positive species identifications were made.

This aspect of the assessment included but was not limited to:

- Undertaking a series of transects across the survey area.
- Searching for evidence (i.e. individuals, tracks, scats, calls) of potential conservation significant species under logs, rocks and leaf litter.
- Observing bird species with binoculars.
- Inspecting tree hollows with a drone.

3.3 LIKELIHOOD OF OCCURRENCE – VERTEBRATE FAUNA OF CONSERVATION SIGNIFICANCE

Vertebrate fauna of conservation significance identified during the literature review as previously being recorded in the general area were assessed and ranked for their likelihood of occurrence within the survey area itself. The rankings and criteria used were:

- **Would Not Occur:** There is no suitable habitat for the species in the survey area and/or there is no documented record of the species in the general area since records have been kept.

- **Unlikely to Occur:** The survey area is outside of the currently documented distribution for the species in question or the species is generally accepted as being locally/regionally extinct (supported by a lack of recent records), or no suitable habitat (type, quality and extent) was identified as being present during the field assessment. Individuals of some species may occur occasionally as vagrants/transients especially if suitable habitat is located nearby but the survey area itself would not support a population or part population of the species.
 - **Locally Extinct:** Populations no longer occur within a small part of the species natural range, in this case within 20km of the survey area. Populations do however persist outside of this area.
 - **Regionally Extinct:** Populations no longer occur in a large part of the species natural range, in this case within the southern forest regions. Populations do however persist outside of this area.
- **Possibly Occurs:** The survey area is within the known distribution of the species in question and habitat of at least marginal quality was identified as being present during the field assessment, supported in some cases by recent records being documented in literature from within or near the survey area. In some cases, while a species may be classified as possibly being present at times, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.
- **Known to Occur:** The species in question was positively identified as being present (for sedentary species) or as using the survey area as habitat for some other purpose (for non-sedentary/mobile species) during the field survey. This information may have been obtained by direct observation of individuals or by way of secondary evidence (e.g. foraging debris, tracks and scats). In some cases, while a species may be classified as known to occur, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.

4. SURVEY LIMITATIONS

No seasonal sampling was carried out as part of this fauna assessment. The conclusions presented are based upon field data and the environmental monitoring and/or testing carried out over a limited period of time and are therefore merely indicative of the environmental condition of the site at the time of the field assessments. It should be recognised that site conditions can change with time.

Lack of observational data on some species should also not necessarily be taken as an indication that a species is absent from the site or does not utilise it for some purpose at times.

During the survey, habitat trees with hollows were searched for. It should be noted that identifying hollows suitable for fauna species from ground level has limitations. Generally,

the full characteristics of any hollow seen are not fully evident (e.g. internal dimensions). It is also difficult to locate all hollows within all trees as some are not observable from ground level. Where considered warranted and if feasible a drone and/or pole camera was deployed to assist in assessing the characteristics of tree hollows.

The location of observations was recorded using a handheld GPS. The accuracy of the GPS cannot be guaranteed above a level of about 5 to 10 metres, though it should be noted that in some circumstance the accuracy can increase or decrease beyond this range.

5. RESULTS

5.1 LITERATURE REVIEW

5.1.1 BIOGEOGRAPHIC SETTING

The project area is situated near the southern boundary of the Southern Jarrah Forest subregion. The Southern Jarrah Forest subregion (JAF02) was defined as part of the revised Interim Biogeographical Regionalisation for Australia (IBRA Version 7) (Commonwealth of Australia 2016). The Southern Jarrah Forest Bioregion is a subset of the larger Jarrah Forest (JAF) Bioregion defined in IBRA Version 7. Within this document the JAF is described as being:

“Duricrusted plateau of Yilgarn Craton characterised by Jarrah-Marri forest on laterite gravels and, in the eastern part, by Marri-Wandoo woodlands on clayey soils. Eluvial and alluvial deposits support Agonis shrublands. In areas of Mesozoic sediments, Jarrah forests occur in a mosaic with a variety of species-rich shrublands. Warm Mediterranean climate”.

A description of the Southern Jarrah Forest (JAF02) is provided by Hearn *et al.* (2002):

“South of Collie the plateau broadens and slopes gently to the south coast. Drainage is still dissected in the west but broadening and leveling of the surface in the east causes poor drainage and large and small wetlands. The ironstone becomes less evident being buried beneath sands.

Rainfall is from 1200 mm in the south-west to 500 mm in the east. Vegetation comprises Jarrah - Marri forest in the west grading to Marri and Wandoo woodlands in the east. There are extensive areas of swamp vegetation in the south-east, dominated by Paperbarks and Swamp Yate. The understory component of the forest and woodland reflects the more mesic nature of this area. The majority of the diversity in the communities occurs on the lower slopes or near granite soils where there are rapid changes in site conditions.

Subregional area of JAF02 is 3,160,122ha.” (Hearn *et al.* 2002).

5.1.2 FAUNA SPECIES OF CONSERVATION SIGNIFICANCE

The literature review identified multiple fauna species of conservation significance as potentially occurring in the general area as listed in Table 1. The NatureMap (DBCA 2022)

and Protected Matter Search Tool (DCCEEW 2022) results, used as a primary source for compiling this listing, are held within Appendix B.

Table 1: Conservation significant fauna previously recorded or potentially occurring within the general vicinity of survey area.

Species	Conservation Status ¹	
	BC Act	EPBC Act
Carter's Freshwater Mussel <i>Westralunio carteri</i>	VU	VU
Balston's Pygmy Perch <i>Nannatherina balstoni</i>	VU	VU
Mud Minnow <i>Galaxiella munda</i>	VU	-
Black-stripe Minnow <i>Galaxiella nigrostriata</i>	EN	EN
Malleefowl <i>Leipoa ocellata</i>	VU	VU
Australasian Bittern <i>Botaurus poiciloptilus</i>	EN	EN
Australian Little Bittern <i>Ixobrychus dubius</i>	P4	-
Migratory Shorebirds/Wetland Species	Various	Various
Hooded Plover <i>Thinornis rubricollis</i>	P4	-
Blue-billed Duck <i>Oxyura australis</i>	P4	-
Peregrine Falcon <i>Falco peregrinus</i>	OS	-
Osprey <i>Pandion cristatus</i>	Mig	Mig
Masked Owl <i>Tyto novaehollandiae novaehollandiae</i>	P3	-
Carnaby's Cockatoo <i>Zanda latirostris</i>	EN	EN
Baudin's Cockatoo <i>Zanda baudinii</i>	EN	EN
Forest Red-tailed Black Cockatoo <i>Calyptorhynchus banksii naso</i>	VU	VU
Muir's Corella <i>Cacatua pastinator pastinator</i>	CD	-
Fork-tailed Swift <i>Apus pacificus</i>	Mig	Mig
Grey Wagtail <i>Motacilla cinerea</i>	Mig	Mig
Chuditch <i>Dasyurus geoffroii</i>	VU	VU

¹ See Appendix A for conservation status codes

Species	Conservation Status ¹	
	BC Act	EPBC Act
South-western Brush-tailed Phascogale <i>Phascogale tapoatafa wambenger</i>	CD	-
Numbat <i>Myrmecobius fasciatus</i>	EN	EN
Quenda <i>Isodon fusciventer</i>	P4	-
Bilby <i>Macrotis lagotis</i>	VU	VU
Western Ringtail Possum <i>Pseudocheirus occidentalis</i>	CR	CR
Woylie <i>Bettongia penicillata ogilbyi</i>	CR	EN
Western Brush Wallaby <i>Notamacropus irma</i>	P4	-
Tammar Wallaby <i>Notamacropus eugenii derbianus</i>	P4	-
Quokka <i>Setonix brahyurus</i>	VU	VU
Water Rat <i>Hydromys chrysogaster</i>	P4	-
Western False Pipistrelle <i>Falsistrellus mackenziei</i>	P4	-

5.2 FIELD SURVEYS

5.2.1 FAUNA HABITAT ASSESSMENT




The 1.7 ha survey area contains four broad scale habitat units, three of which are primarily based on vegetation composition as defined by Ecoedge (2022). Just over half (0.92 ha ~53%) of the survey area contains an open forest of jarrah, marri and flooded gum over a tall open shrubland/shrubland of various species. A low woodland of paperbark and banksia over a tall open shrubland/shrubland and forbland, which makes up about 0.21 ha (12%) of the survey area, borders a 64 metre section of the Tone River. The balance of the survey area (0.61 ha ~35%) is represented by cleared land including the existing road pavement.


To put this small area of vegetation into perspective there is approximately 100,000 ha of remnant native vegetation within 20 km of the survey area (DPIRD 2022).

The vegetation present ranges from completely degraded (cleared) to very good condition (Ecoedge 2022). With respect to fauna habitat values, the majority of the vegetation appears to be in good to very good condition and would therefore have the capacity to support a range of native fauna species known to frequent the wider area. The small size of the survey area and the limited range of habitat types would however limit the overall fauna biodiversity. The fact that vegetation within the survey area is continuous with the Tone River Nature Reserve and extensive areas of state forest increases the probability that some species which would otherwise not persist may at least occasionally be present.

Example images of the various fauna habitats present are provided in Table 2. The location and extent of the identified fauna habitats are shown in Figure 3.

Table 2: Example images of the fauna habitats within the survey area

Fauna Habitat Description	Example Image
<p>Open forest of jarrah, marri and flooded gum over a tall open shrubland/shrubland of various species.</p> <p>Area= 0.92 ha (53%)</p>	
<p>Low woodland of paperbark and banksia over a tall open shrubland/shrubland and forbland.</p> <p>Area= 0.21 ha (12%)</p>	
<p>Tone River – bordered by above-mentioned habitat unit and cleared ground.</p> <p>Length within survey area ~64 metres</p>	

Fauna Habitat Description	Example Image
<p>Cleared areas including existing road.</p> <p>Area= 0.61 ha (35%)</p>	

5.2.2 BLACK COCKATOO HABITAT ASSESSMENT

5.2.2.1 Breeding Habitat Assessment

Trees considered potentially suitable for black cockatoos to use as nesting habitat (subject to a suitable hollow being present and other factors) found within the survey area comprised the following species:

- Marri – *Corymbia calophylla*;
- Jarrah – *Eucalyptus marginata*; and
- Flooded Gum - *Eucalyptus rudis*;

A summary of the habitat trees observed is provided in Table 3. The locations of habitat trees are shown in Figure 4.

Table 3: Summary of potential habitat trees (DBH \geq 50cm) within the survey area

Total Number of Habitat Trees (DBH > 50cm)	Number of Habitat Trees with <u>No Hollows Observed</u> (MRWA Category 7)	Number of Habitat Trees with <u>Possible Hollows</u> considered <u>Unsuitable</u> for Black Cockatoos (MRWA Category 6)	Number of Habitat Trees with <u>Possible Hollows</u> considered <u>Potentially suitable</u> for Black Cockatoos (MRWA Category 1 to 5)	Tree Species		
				Marri	Jarrah	Flooded Gum
30	23	7	0	8	17	5

The assessment identified 30 trees within the survey area with a DBH of \geq 50cm. Most of these trees (23) appeared to not contain hollows of any size and were therefore placed in MRWA Category 7. Seven (7) trees contained apparent or obvious hollows, all of which

were assessed as being unlikely to be suitable for black cockatoos to currently use for nesting purposes, due to the hollows apparent small size, unsuitable orientation and/or low height above ground level. These trees were placed in MRWA Category 6.

Additional details on each habitat tree observed can be found in Appendix D.

Based on available mapping, there is approximately 39,000 ha of remnant native vegetation within 12 km of the survey area (DPIRD 2022). Much of this is likely to contain “potential” breeding habitat as defined by DCCEEW (i.e. suitable tree species with a DBH \geq 50cm). The author is not aware of any dataset that specifically documents known nest hollows in the general area.

5.2.2.2 Foraging Habitat Assessment


The following flora species are known to be or are potentially used as a direct food source (e.g. seeds, flowers, nectar, bark or grubs) by one or more species of black cockatoo were recorded within the survey area:

- Marri – *Corymbia calophylla*;
- Jarrah – *Eucalyptus marginata*;
- Flooded Gum - *Eucalyptus rudis*;
- River Banksia - *Banksia seminuda*
- Orange wattle – *Acacia saligna*;
- Olive-leaved Hakea – *Hakea oleifolia*; and
- Grass Tree - *Xanthorrhoea preissii*.

It should be noted that some of the above-mentioned species (e.g. flooded gum, hakea and grass trees) while foraged upon on occasions would make up only a small proportion of any one bird’s diet relative to more favoured plant species such as marri.

Evidence of black cockatoos foraging within the survey area was found in the form of chewed marri fruits at a number of locations. All the evidence was attributed to the forest red-tailed black cockatoo based on the nature of the foraging activity. An example image is provided in Table 4.

Table 4: Foraging Evidence Examples

Foraging Evidence Description	Example Image
Marri fruits – foraging activity attributed to the Forest Red-tailed Black Cockatoo.	

Based on available mapping there is about 39,000 ha of remnant native vegetation within 12 km of the survey area (DPIRD 2022). Much of this is likely to represent black cockatoo foraging habitat of some type.

The foraging values of each of the identified vegetation/habitat units (Figure 3) for each black cockatoo species is given in Table 5. The table shows foraging value based upon vegetation characteristics, with the total value including context and species density.

Table 5: Foraging values of vegetation recorded for black cockatoos.

Habitat Description	Vegetation Characteristics			Site Context			Species Density			Total Score		
	CBC	BBC	FRTBC	CBC	BBC	FRTBC	CBC	BBC	FRTBC	CBC	BBC	FRTBC
Open forest of jarrah, marri and flooded gum	3	3	3	0	0	0	1	1	1	4	4	4
Low woodland of paperbark and banksia	1	1	0	0	0	0	0	0	0	1	1	0
Tone River	0	0	0	0	0	0	0	0	0	0	0	0
Cleared	0	0	0	0	0	0	0	0	0	0	0	0

Vegetation within the survey area has been assessed as being of low foraging value to all three species of black cockatoo (Total Score 0, 1 or 4 out of 10). The low foraging value scores can largely be attributed to the limited extent of native vegetation present (<0.1% of the vegetation within 12km) and the paucity/absence of preferred foraging species in nearly 50% of the survey area.

5.2.2.3 Night Roosting Habitat Assessment

No evidence of black cockatoos roosting within trees located within the survey area was observed during the survey period. It is difficult to determine if trees or groves of trees within the survey area represent potential roosting habitat as a range of factors, not all of which can be observed, determine suitability. Some of the larger trees may be suitable for roosting but as indicated no actual evidence of use was seen.

A review of the 2019 Great Cocky Count database shows no documented roost sites within the survey area. The 2019 Great Cocky Count recorded the closest active roost, approximately 12 kilometres south west of the survey area (Site ID: MNJMNJR001). This roost was being used by 44 “white-tailed black cockatoos” and 35 forest red-tailed black cockatoo during the April 2019 survey (Peck *et al.* 2019). No other documented roost sites occur within 12 km of the survey area.

5.2.3 WESTERN RINGTAIL POSSUM ASSESSMENT

The only evidence of western ringtail possum observed during the day survey was a single old scat found at the base of a jarrah tree in the south-west section of the survey area (see Table 6). No dreys or WRP individuals were recorded. There are two records of western ringtail possums in the DBCA threatened fauna database situated within about 100 metres of the survey area. Both records are from 1994.

Seven potential hollow bearing “habitat trees” (i.e. DBH \geq 50cm) were recorded within the survey area. Some of these trees (and some additional trees with smaller DBHs) may have hollows suitable for WRPs to use for daytime refuge.

Superficially all of the areas of vegetation present within the survey area appear to represent potential WRP habitat given the presence of areas of dense midstorey/tall shrub layer and a continuous canopy (see Figure 3). The limited evidence of the species does however suggest that it is present in relatively low densities.




5.2.4 FAUNA OBSERVATIONS



Fifteen fauna species (mainly common bird species) were observed or secondary evidence of their presence recorded during the field survey. A full listing of the species observed is held on Appendix C.

Evidence of the five fauna species of conservation significance was recorded. In addition to the forest red-tailed black cockatoo (foraging activity, heard) and western ringtail possum (scat) being recorded, Baudin’s cockatoo (heard), woylie (diggings) and chuditch (scats) were also recorded.

Some example images of the secondary evidence of various fauna species observed are contained within Table 6.

Table 6: Fauna evidence examples

Fauna Evidence Description	Example Image
<p>Marri fruits – foraging activity attributed to the Forest Red-tailed Black Cockatoo.</p>	
<p>Scat – attributed to the western ringtail possum.</p>	
<p>Scats – attributed to the common brushtail possum.</p>	

Fauna Evidence Description	Example Image
<p>Diggings – attributed to woylie foraging activity.</p>	
<p>Scats – attributed to the chuditch.</p>	

No evidence of any other fauna species of conservation significance was observed. However, this does not eliminate the potential for some species to still occur, if only infrequently.

6. LIKELIHOOD OF OCCURRENCE – VERTEBRATE FAUNA OF CONSERVATION SIGNIFICANCE

Based on the information gathered during the site reconnaissance survey and the documented distribution and habitat preferences of the species of conservation significance identified as potentially being present in the general area, their likelihood of occurrence within the survey area itself has been assessed. A summary of this assessment is presented in Table 7.

Some comments on the possible impacts of any proposed development are also provided though as no specific development plan has been put forwards these are preliminary comments that should be reviewed as planning progresses.

Five vertebrate fauna species of conservation significance (listed as State or Federal threatened/migratory species or as DBCA priority species) were positively identified as utilising the survey area for some purpose during the survey period:

- Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso* – Vulnerable (BC/EPBC Act). Foraging evidence attributed to this species was recorded and several individuals heard calling. The survey area contains potential black cockatoo breeding habitat (trees with a DBH >50cm) though no possible or actual hollows were recorded. Just over half the survey area contains low value foraging habitat in the form of marri/jarrah dominated forest. No evidence of roosting observed.
- Baudin's Cockatoo *Zanda baudinii* – Endangered (BC/EPBC Act). Several individuals of this species heard calling. The survey area contains potential black cockatoo breeding habitat (trees with a DBH >50cm) though no possible or actual hollows were recorded. Just over half the survey area contains low value foraging habitat mainly in the form of jarrah/marri dominated forest. No evidence of roosting observed.
- Western Ringtail Possum *Pseudocheirus occidentalis* – Critically Endangered (BC/EPBC Act). A single WRP scat was located in the survey area. No other evidence of the species was observed. Previous, though old records, from immediate vicinity. It appears that while there is some superficially suitable habitat (i.e. forest and woodland) it appears to only be in use by a relatively small number of individuals.
- Chuditch *Dasyurus geoffroii* - Vulnerable (BC/EPBC Act). Two scats attributed to this species were located in the survey area. No other evidence of the species was observed. Previous, though old records, from within 5 km. No evidence of any daytime refuge sites observed so the species may not actually reside in the survey area itself.
- Woylie *Bettongia penicillata ogiby* – Critically Endangered (BC Act)/Endangered (EPBC Act). Diggings attributed to this species found to be very numerous over much of the survey area, west of the existing road. Numerous historical records from surrounding areas. No evidence of any daytime refuge sites observed so the species may not actually reside in the survey area itself.

Several additional species of conservation significance may utilise the survey area for some purpose at times, but their status on-site and/or in the general area is more difficult to determine because they were not sighted during the field survey, or evidence of use was not observed:

- Carnaby's Cockatoo *Zanda latirostris* – Endangered (BC/EPBC Act). No evidence of this species recorded. The survey area contains potential black cockatoo breeding habitat (trees with a DBH >50cm) though no possible or actual hollows were recorded. Just over half the survey area contains low value foraging habitat mainly in the form of marri/jarrah dominated forest. No evidence of roosting observed. The survey area falls well within this species modelled distribution. Listed as a potential species based on available information.

- Muir's Corella *Cacatua pastinator pastinator* - CD (BC Act). Status of this species within the survey area is difficult to determine, however, given the location is within its documented range, documented nearby records it must be assumed to be occur, if only occasionally. Listed as a potential species based on available information.
- Peregrine Falcon *Falco peregrinus* – OS (BC Act)
This species potentially utilises some sections of the survey area as part of a much larger home range though it is only likely to occur infrequently. All areas represent potential foraging habitat for this species. No potential nest sites present. Listed as a potential species based on available information.
- Masked Owl *Tyto novaehollandae* – P3 (BC Act Priority Species)
Status in the general area is difficult to determine. May utilise woodland areas within and near the survey area for roosting and may forage in more open areas. None of the hollow bearing trees present appear suitable as potential nest sites. Listed as a potential species based on available information.
- South-western Brush-tailed Phascogale *Phascogale tapoatafa wambenger* – CD (BC Act)
Status of this species within the survey area is difficult to determine, however, given the location is within its documented range, documented nearby records and the presence of habitat that appears suitable (forest) it must be assumed to be present. Some of the hollow bearing trees represent possible day time refuge sites. Listed as a potential species based on available information.
- Quenda *Isodon fusciventer* – P4 (BC Act Priority Species)
No evidence of this species observed however areas of dense groundcover in the survey area represents potential habitat for this species. Listed as a potential species based on available information.
- Western Brush Wallaby *Notamacropus irma* - P4 (BC Act Priority Species). Status of this species within the survey area is difficult to determine, however, given the location is within its documented range, documented nearby records and the presence of habitat that appears suitable it must be assumed to be present, though most likely infrequently and for brief periods given ongoing disturbance by passing traffic. Listed as a potential species based on available information.
- Tammar *Notamacropus eugenii derbianus* - P4 (BC Act Priority Species). Status of this species within the survey area is difficult to determine, however, given the location is within its documented range, documented nearby records and the presence of habitat that appears suitable it must be assumed to be present, though most likely infrequently and for brief periods given ongoing disturbance by passing traffic. Listed as a potential species based on available information.
- Western False Pipistrelle *Falsistrellus mackenziei* – P4 (BC Act Priority Species)
Status of this species within the survey area is difficult to determine, however, given the location is within its documented range, documented nearby records and the presence of habitat that appears suitable it must be assumed to be present. All sections of the survey area represent potential foraging habitat for this species

and any hollow bearing trees represent possible day time roost sites. Listed as a potential species based on available information.

- Water Rat *Hydromys chrysogaster* – P4 (BC Act Priority Species)
Status of this species within the survey area is difficult to determine, however, given the location is within its documented range, documented nearby records on the Tone River and the presence of habitat that appears suitable it must be assumed to be present. Unlikely to permanent reside in the survey area. Listed as a potential species based on available information.

A number of other species of conservation significance (as listed in Table 7), while possibly present in the larger bush remnants in the wider area (e.g. State forest /reserve areas) are not listed as potentially occurring within the survey area primarily due to a complete lack of suitable habitat (quality and extent) and/or known local/regional extinction.

The specific nature of the proposed road works has not been finalised and therefore it is difficult to determine likely impacts. In cases where some habitat is present and available information indicates at least some probability of the species occurrence, likely impacts are anticipated to most likely to be related to the loss of a small area of habitat and the potential for some species to be killed or injured during clearing.

This in particular relates to those species that utilise hollow bearing trees for daytime refuge and some ground-based species that seek daytime refuge in burrows, fallen hollow logs/log piles or dense undergrowth.

Management of actions that will affect fauna and fauna habitat will therefore be required to minimise any potential impacts to acceptable levels. Potential impacts on fauna should be reviewed as planning progresses.

Table 7: Likelihood of Occurrence – Fauna Species of Conservation Significance

Species	Conservation Status		Habitat Preferences	Habitat Present	Likelihood of Occurrence	Comments/Possible Impacts
	BC Act	EPBC Act				
Carter's Freshwater Mussel <i>Westralunio carteri</i>	VU	VU	Occurs in greatest abundance in slower flowing streams with stable sediments that are soft enough for burrowing amongst woody debris and exposed tree roots.	Yes/Marginal	Unlikely to Occur.	Habitat (Tone River) appears superficially suitable but no evidence of species seen and no records from any source of the species from immediate vicinity. Water salinity possibly too high. No impact on this species anticipated.
Balston's Pygmy Perch <i>Nannatherina balstoni</i>	VU	VU	Acidic, tannin stained freshwater pools, streams and lakes within 30km of the coast, typically situated amongst peat flats. Prefers shallow water and is commonly found in association with tall sedge thickets.	Yes/Marginal	Unlikely to Occur.	Habitat (Tone River) appears superficially suitable but no evidence of species seen and no records from any source of the species from immediate vicinity. Water salinity possibly too high. Feral fish present. No impact on this species anticipated.
Mud Minnow <i>Galaxiella munda</i>	VU	-	Typically found in small flowing streams near submerged vegetation, occasionally in still water of ponds, swamps and roadside drains. Water is usually darkly tannin stained and acidic (pH 3.0 – 6.0).	Yes/Marginal	Unlikely to Occur.	Habitat (Tone River) appears superficially suitable but no evidence of species seen and no records from any source of the species from immediate vicinity. Water salinity possibly too high. Feral fish present. No impact on this species anticipated.
Black-stripe Minnow <i>Galaxiella nigrostriata</i>	EN	EN	Permanent or ephemeral pools, roadside ditches and small creeks in sandy, thickly vegetated wetland areas. Water is usually darkly tannin stained and acidic (pH 4.6 – 6.5).	Yes/Marginal	Unlikely to Occur.	Habitat (Tone River) appears superficially suitable but no evidence of species seen and no records from any source of the species from immediate vicinity. Water salinity possibly too high. Feral fish present. No impact on this species anticipated.
Malleefowl <i>Leipoa ocellata</i>	VU	VU	Mainly scrubs and thickets of mallee <i>Eucalyptus</i> spp., boree <i>Melaleuca lanceolata</i> and bowgada <i>Acacia linophylla</i> , also dense litter forming shrublands.	Yes	Would Not Occur.	This species is regionally extinct. No impact on this species will occur.
Australasian Bittern <i>Botaurus poiciloptilus</i>	EN	EN	Freshwater wetlands, occasionally estuarine; prefers heavy vegetation such as beds of tall dense <i>Typha</i> , <i>Baumea</i> and sedges in freshwater swamps.	No	Would Not Occur.	No suitable habitat. No impact on this species will occur.
Australian Little Bittern <i>Ixobrychus dubius</i>	P4	-	Dense vegetation surrounding/within freshwater pools, swamps and lagoons, well screened with trees. Shelters in dense beds of <i>Typha</i> , <i>Baumea</i> and tall rushes in freshwater swamps around lakes and along rivers.	No	Would Not Occur.	No suitable habitat. No impact on this species will occur.

Species	Conservation Status		Habitat Preferences	Habitat Present	Likelihood of Occurrence	Comments/Possible Impacts
	BC Act	EPBC Act				
Migratory Shorebirds/Wetland Species	Mig, Various	Ma, Mig, Various	Varies between species but includes open ocean, beaches and permanent/temporary wetlands varying from billabongs, swamps, lakes, floodplains, sewerage farms, saltwork ponds, estuaries, lagoons, mudflats sandbars, pastures, airfields, sports fields and lawns.	No	Would Not Occur.	No suitable habitat. All records of these species in the general area are from lake systems. No impact on this range of species will occur.
Hooded Plover <i>Thinornis rubricollis</i>	P4	-	Broad sandy ocean beaches and bays, coastal and inland salt lakes.	No	Would Not Occur.	No suitable habitat. No impact on this species will occur.
Blue-billed Duck <i>Oxyura australis</i>	P4	-	Well vegetated freshwater swamps, large dams and lakes, winters on more open water. Occasionally salt lakes and estuaries freshened by floodwaters.	No	Would Not Occur.	No suitable habitat. No impact on this species will occur.
Peregrine Falcon <i>Falco peregrinus</i>	OS	-	Diverse from rainforest to arid shrublands, from coastal heath to alpine. Mainly about cliffs along coasts, rivers and ranges and about wooded watercourses and lakes.	Yes	Possibly Occurs.	Loss/modification of very small areas of potential foraging habitat. No potential nest sites observed. Any impact on this species anticipated to be negligible.
Osprey <i>Pandion cristatus</i>	Mig	Mig	Coasts, estuaries, bays, inlets, islands, and surrounding waters, coral atolls, reefs, lagoons, rock cliffs and stacks. Ascends larger rivers.	No	Would Not Occur.	No suitable habitat. No impact on this species will occur.
Masked Owl (SW population) <i>Tyto n. novaehollandiae</i>	P3	-	Roosts and nests in heavy forest, hunts over open woodlands and farmlands.	Yes	Possibly Occurs.	Loss/modification of small areas of foraging habitat. No potential nest sites observed. Any impact on this species anticipated to be negligible.
Carnaby's Cockatoo <i>Zanda latirostris</i>	EN	EN	Forests, woodlands, heathlands, farms; feeds on <i>Banksia</i> , <i>Hakea</i> and <i>Marr</i> .	Yes	Possibly Occurs.	Loss/modification of small areas of foraging habitat. No potential nest sites observed. Any impact on this species anticipated to be negligible.
Baudin's Cockatoo <i>Zanda baudinii</i>	EN	EN	Mainly eucalypt forests where it feeds primarily on the marr seeds.	Yes	Known to Occur.	Loss/modification of small areas of foraging habitat. No potential nest sites observed. Any impact on this species anticipated to be negligible.
Forest Red-tailed Black Cockatoo <i>Calyptorhynchus banksii naso</i>	VU	VU	Eucalypt forests, feeds on marr, jarrah, blackbutt, karri, sheoak and snottygobble.	Yes	Known to Occur.	Loss/modification of small areas of foraging habitat. No potential nest sites observed. Any impact on this species anticipated to be negligible.
Muir's Corella <i>Cacatua pastinator</i>	CD	-	Fragmented woodland areas on the eastern side of the main forest block in southwestern Australia.	Yes	Possibly Occurs.	Loss/modification of small areas of habitat. No potential nest sites observed. Any impact on this species anticipated to be negligible.

Species	Conservation Status		Habitat Preferences	Habitat Present	Likelihood of Occurrence	Comments/Possible Impacts
	BC Act	EPBC Act				
Fork-tailed Swift <i>Apus pacificus</i>	Mig	Ma, Mig	Low to very high airspace over varied habitat from rainforest to semi desert.	Yes	Unlikely to Occur, Flyover only on very rare occasions.	May occur very occasionally for brief periods. Entirely aerial. No impact on this species will occur.
Grey Wagtail <i>Motacilla cinerea</i>	Mig	Mig	In Australia, near running water in disused quarries, sandy, rocky streams in escarpments and rainforest, sewerage ponds, ploughed fields and airfields.	Yes/Marginal	Unlikely to Occur.	Very rarely recorded in south west WA. No impact on this species anticipated.
Chuditch <i>Dasyurus geoffroii</i>	VU	VU	Forest, mallee shrublands, woodland and desert. The densest populations have been found in riparian jarrah forest.	Yes	Known to Occur.	Loss/modification of small areas of habitat. No potential daytime refuge sites observed but may utilise hollow logs/burrows for daytime refuge. Potential impacts will require management.
South-west Brush-tailed Phascogale <i>Phascogale tapoatafa wambenger</i>	CD	-	Dry sclerophyll forests and open woodlands that contain hollow-bearing trees but a sparse ground cover.	Yes	Possibly Occurs.	Loss/modification of small areas of habitat including hollow trees possibly used for daytime refuge. Potential impacts will require management.
Numbat <i>Myrmecobius fasciatus</i>	EN	EN	Open Woodlands generally dominated by eucalypts that provide hollow logs and branches for shelter and termites for food.	Yes	Possibly Occurs.	Loss/modification of small areas of habitat including hollow logs possibly used for daytime refuge. Potential impacts will require management.
Quenda <i>Isodon fusciventer</i>	P4	-	Dense scrubby, often swampy, vegetation with dense cover.	Yes	Possibly Occurs.	Loss/modification of small areas of habitat including possible ground-based nest sites used for daytime refuge. Potential impacts will require management.
Bilby <i>Macrotis lagotis</i>	VU	VU	Acacia shrublands, spinifex and hummock grassland. Mitchell grass and stony downs country if cracking clay, also desert sand plains and dune fields sometimes with spinifex hummock grassland and acacia shrubland.	No	Would Not Occur.	This species is regionally extinct. No suitable habitat. No impact on this species will occur.
Western Ringtail Possum <i>Pseudocheirus occidentalis</i>	CR	CR	Coastal peppermint, coastal peppermint-tuart, jarrah-marri associations, sheoak woodland, and eucalypt woodland and mallee.	Yes	Known to Occur.	Loss/modification of small areas of habitat including possible hollow trees used for daytime refuge. Potential impacts will require management.
Woylie <i>Beltongia penicillata ogilbyi</i>	CR	EN	Open sclerophyll forest and woodland with a low, dense, understorey of tussock grasses or woody scrub.	Yes	Known to Occur.	Loss/modification of small areas of habitat including possible ground based nest sites used for daytime refuge. Potential impacts will require management.
Quokka <i>Setonix brahmyurus</i>	VU	VU	Currently restricted to densely vegetated coastal/near coastal heaths, swamps, riverine habitats including tea-tree thickets on sandy soils along creek systems.	No	Would Not Occur.	No suitable habitat. No impact on this species will occur.

Species	Conservation Status		Habitat Preferences	Habitat Present	Likelihood of Occurrence	Comments/Possible Impacts
	BC Act	EPBC Act				
Western Brush Wallaby <i>Notamacropus irma</i>	P4	-	Open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets.	Yes	Possibly Occurs.	Loss/modification of small areas of habitat. Would not reside onsite so any impact on this species anticipated to be negligible.
Tammar Wallaby <i>Notamacropus eugenii</i> <i>derbianus</i>	P4	-	Dense, low vegetation for daytime shelter and open grassy areas for feeding. This species inhabits coastal scrub, heath, dry sclerophyll forest and thickets in mallee and woodland	Yes	Possibly Occurs.	Loss/modification of small areas of habitat. Would not reside onsite so any impact on this species anticipated to be negligible.
Western False Pipistrelle <i>Falsistrellus mackenziei</i>	P4	-	Wet sclerophyll forest dominated by karri and in high rainfall zones of the jarrah and marri forest.	Yes	Possibly Occurs.	Loss/modification of small areas of habitat including possible hollow bearing roost trees. Potential impacts will require management.
Water Rat <i>Hydromys chrysogaster</i>	P4	-	Permanent water, fresh, brackish or marine.	Yes	Possibly Occurs.	Loss/modification of small areas of habitat. Unlikely to reside onsite so any impact on this species anticipated to be negligible.

See Appendix A for conservation status codes

7. CONCLUSION

The fauna assessment within the survey area was primarily undertaken to document black cockatoo habitat and to determine the possible presence of western ringtail possums and other conservation significant fauna species and/or their habitat.

With respect to fauna habitat values, the majority of the vegetation appears to be in good to very good condition and would therefore have the capacity to support a range of native fauna species known to frequent the wider area. The small size of the survey area and the limited range of habitat types would however limit the overall fauna biodiversity.

The fact that vegetation within the survey area is continuous with the Tone River Nature Reserve and extensive areas of state forest increases the probability that some species which would otherwise not persist may at least occasionally be present. This fact increases the potential fauna species list but many would only occur infrequently, it being unlikely that any species is specifically relying on this small area of vegetation to persist.

A total of 30 potential black cockatoo breeding “habitat trees” were identified within the survey area. No actual or potential black cockatoo nest trees were identified with most trees appearing to have no hollows or hollows whose characteristics were assessed as being unsuitable.

Vegetation within the survey area has been assessed as being of low foraging value to all three species of black cockatoo. The low foraging value scores can largely be attributed to the limited extent of native vegetation present (<0.1% of the vegetation within 12km) and the paucity/absence of preferred foraging species in nearly 50% of the survey area.

No evidence of black cockatoos roosting within trees located within the survey area was observed during the survey period. The 2019 Great Cocky Count recorded the closest active roost, approximately 12 kilometres southwest of the survey area (Site ID: MNJMNJR001). This roost was being used by 44 “white-tailed black cockatoos” and 35 forest red-tailed black cockatoo during the April 2019 survey (Peck *et al.* 2019). No other documented roost sites occur within 12 km of the survey area.

The only evidence of western ringtail possum observed during the day survey was a single old scat found at the base of a jarrah tree in the south-west section of the survey area. The lack of evidence of the species presence suggest that it occurs in the area in relatively low densities. It has been concluded that only a few individuals, if any would be present at any one time.

Fifteen fauna species (mainly common bird species) were observed or secondary evidence of their presence recorded during the field survey. In summary five vertebrate fauna species of conservation significance were positively identified as utilising the survey area:

- Forest Red-tailed Black Cockatoo – Vulnerable (WA/Federal);
- Baudin’s Black Cockatoo – Endangered (WA/Federal);

- Western Ringtail Possum – Critically Endangered (WA/Federal);
- Chuditch - Vulnerable (WA/Federal);
- Woylie – Critically Endangered (WA)/Endangered (Federal).

Several additional species of conservation significance may also utilise the survey area, though, as no evidence of their presence was identified during the field survey, their status in the area remains uncertain:

- Carnaby's Cockatoo – Endangered (WA/Federal);
- Muir's Corella - CD (WA);
- Peregrine Falcon – OS (WA);
- Masked Owl – Priority 3 (WA Priority Species);
- Carnaby's Black Cockatoo – Endangered (WA/Federal);
- South-western Brush-tailed Phascogale - CD (WA);
- Quenda - Priority 4 (WA Priority Species);
- Western Brush Wallaby - P4 (WA Priority Species);
- Tammar - P4 (WA Priority Species);
- Western False Pipistrelle – Priority 4 (WA Priority Species);
- Water Rat *Hydromys chrysogaster* – P4 (WA Priority Species).

The specific nature of the proposed road works has not been finalised and therefore it is difficult to determine likely impacts. In cases where some habitat is present and available information indicates at least some probability of the species occurrence, likely impacts are anticipated to most likely to be related to the loss of a small area of habitat and the potential for some species to be killed or injured during clearing.

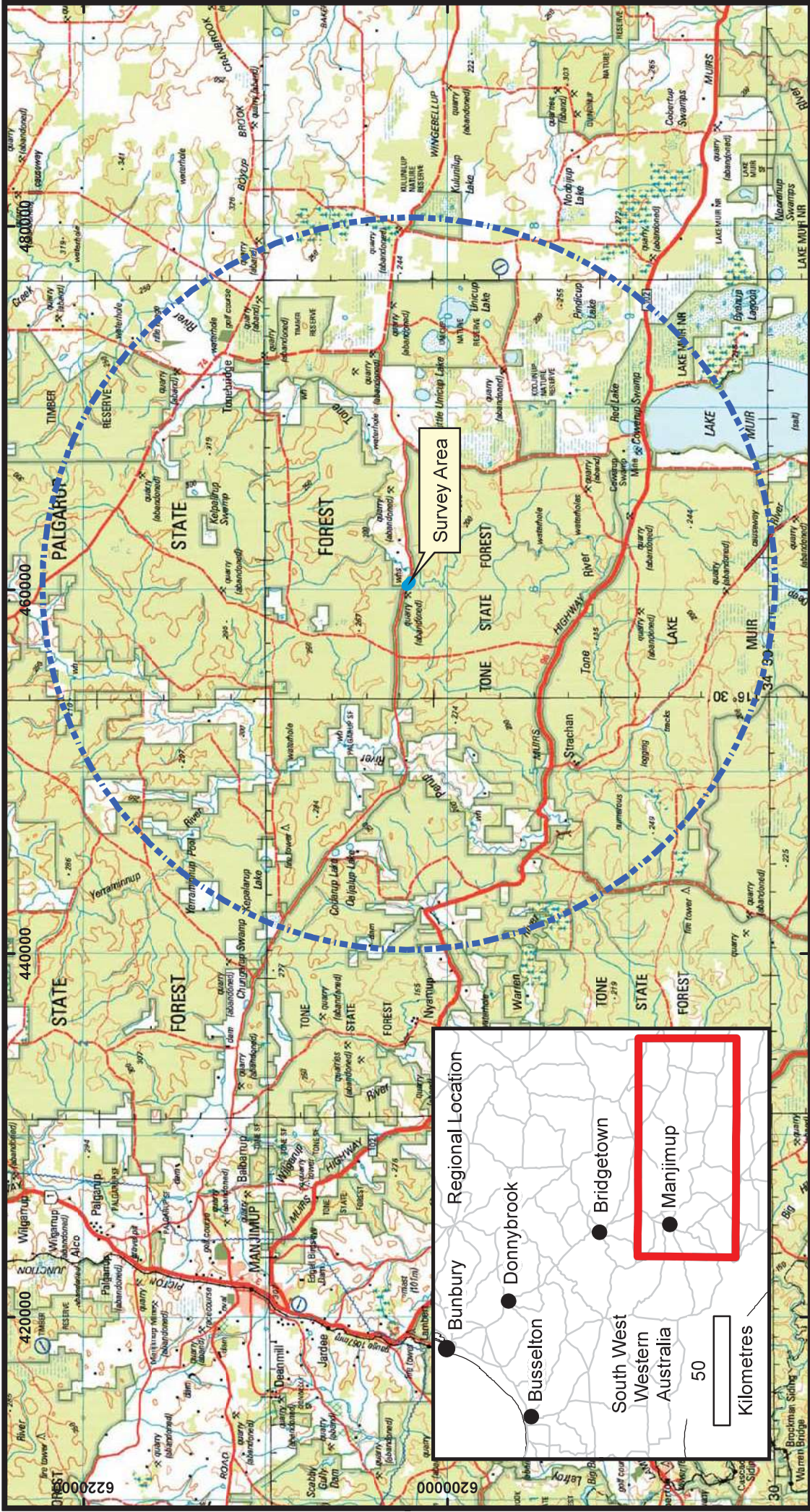
This in particular relates to those species that utilise hollow bearing trees for daytime refuge and some ground-based species that seek daytime refuge in burrows, fallen hollow logs/log piles or dense undergrowth.

Management of actions that will affect fauna and fauna habitat will therefore be required to minimise any potential impacts to acceptable levels. Potential impacts on fauna should be reviewed as planning progresses.


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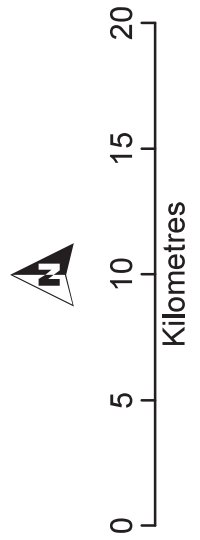
FIGURES



Bridge 3923 Replacement and Side Track Mordalup Road Study Area and Surrounds



Drawn: G Harewood
Date: Feb 2023
Scale: 1: 250,000
Projection/Coordinate System: UTM/MGA2020 Zone 50



Legend

-  Study Area (20km Buffer around Survey Area)
-  Survey Area



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



Drawn: G Harewood
Date: Feb 2023
Scale: 1:2,000

Bridge 3923 Replacement
and Side Track
Mordalup Road
Survey Area
Aerial Photograph

Projection/Coordinate System: UTM/MGA2020 Zone 50 | Figure: 2



Legend

 Survey Area



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Legend

 Survey Area

 Open forest of jarrah, marri and flooded gum

 Low woodland of paperbark and banksia

 Cleared

 Tone River

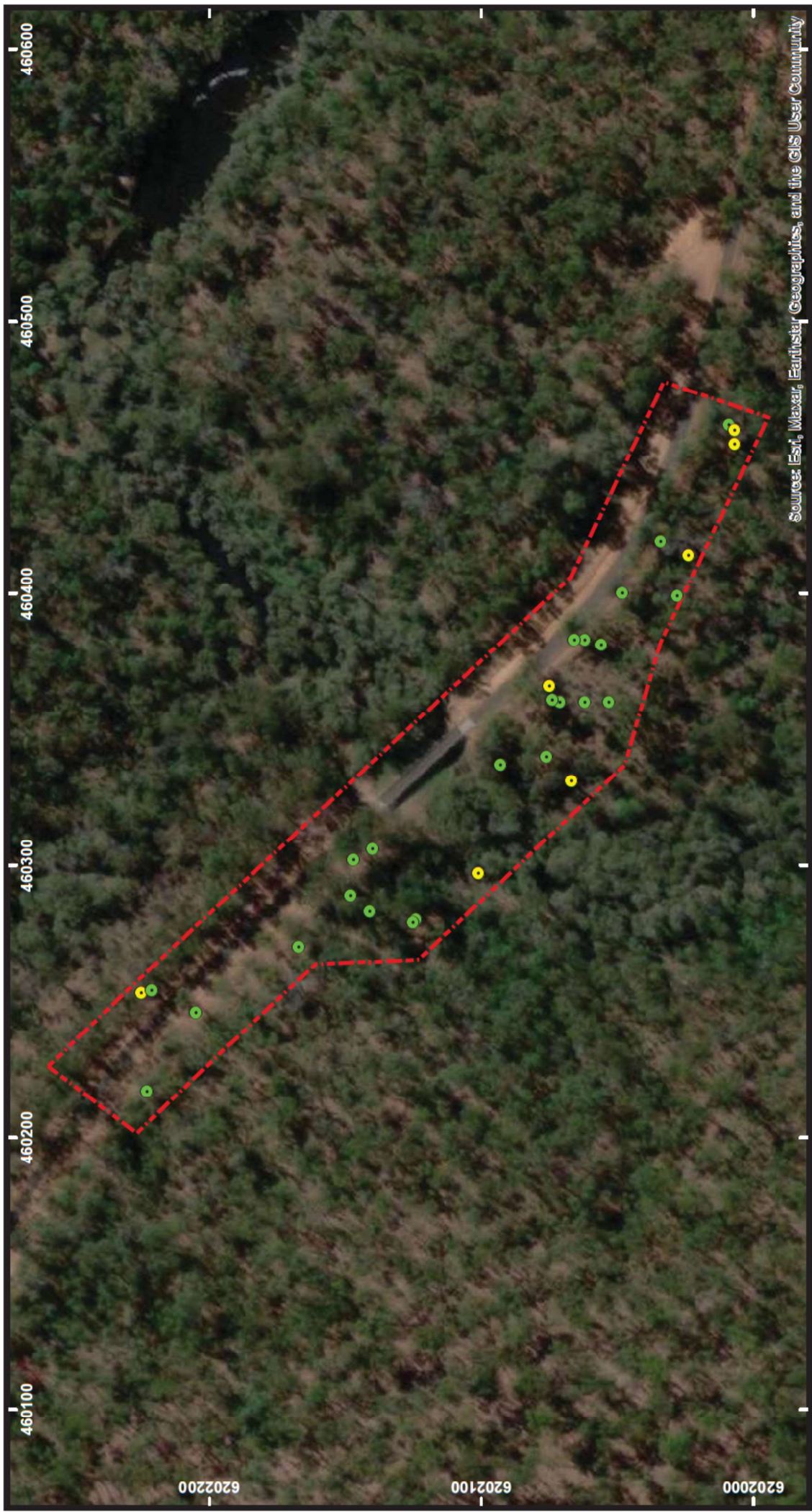


Drawn: G Harewood


Date: Feb 2023

Scale: 1:2,000

Bridge 3923 Replacement
and Side Track
Mordalup Road
Survey Area
Fauna Habitats



Source: Est, Maxar, Earthstar Geographics, and the GIS User Community




Fauna Survey

Drawn: G Harewood
Date: Feb 2023
Scale: 1:2,000

**Bridge 3923 Replacement
and Side Track
Mordalup Road
Survey Area
Habitat Trees
(DBH >50cm)**

Legend

- Survey Area
- Habitat Tree - No visible hollows
- Habitat Tree - One or more visible hollows
- None suitable for black cockatoos





0 25 50 75 100
Metres

APPENDIX A

CONSERVATION CATEGORIES

**Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
Threatened Fauna Categories**

Threatened fauna may be listed under Section 178 of the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* in any one of the following categories:

Category	Code	Description
Extinct	E	There is no reasonable doubt that the last member of the species has died.
*Extinct in the wild	EW	A species (a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
*Critically Endangered	CE	A species is facing an extremely high risk of extinction in the wild in the immediate future.
*Endangered	EN	A species: (a) is not critically endangered; and (b) is facing a very high risk of extinction in the wild in the near future.
*Vulnerable	VU	A species (a) is not critically endangered or endangered; and (b) is facing a high risk of extinction in the wild in the medium-term future.
Conservation Dependent	CD	A species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered
*Migratory	Migratory	(a) all migratory species that are: (i) native species; and (ii) from time to time included in the appendices to the Bonn Convention; and (b) all migratory species from time to time included in annexes established under JAMBA, CAMBA and ROKAMBA; and (c) all native species from time to time identified in a list established under, or an instrument made under, an international agreement approved by the Minister.
Marine	Ma	Species in the list established under s248 of the <i>EPBC Act</i>

Note: Only species in those categories marked with an asterisk are matters of national environmental significance (NES) under the *EPBC Act*.

Biodiversity Conservation Act 2016 (BC Act)
Specially Protected Fauna Categories

Biodiversity Conservation (Listing of Native Species) (Fauna) Order 2022, made by the Minister under sections 13(1), 19(1) and 23(1) of the Act and regulation 174(1) of the Biodiversity Conservation Regulations 2018

Threatened Species		
Category	Code	Description
Critically Endangered species	CR	Species 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
Endangered species	EN	Species 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.
Vulnerable species	VU	Species 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.
Presumed extinct species	EX	Species where there is no reasonable doubt that the last member of the species has died.
Extinct in the wild species	EW	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 from.
Specially Protected Species		
Category	Code	Description
Migratory Species	MI	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 <i>BC Act</i>)
Species of special conservation interest (conservation dependent)	CD	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 <i>BC Act</i>).
Species otherwise in need of special protection (other specially protected).	OS	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 <i>BC Act</i>).

Priority Species*		
Category	Code	Description
Priority 1 (P1) Poorly Known Species.	P1	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.
Priority 2 (P2) Poorly Known Species.	P2	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.
Priority 3 (P3) Poorly Known Species.	P3	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.
Priority 4 (P4) Rare, Near Threatened and other species in need of monitoring.	P4	<p>(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.</p> <p>(b) Near Threatened: Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable, but are not listed as Conservation Dependent.</p> <p>(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p>

*Priority is not a listing category under the BC Act.

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.

IUCN Red List Threatened Species Categories

The *IUCN Red List of Threatened Species*[™] is a checklist of taxa that have undergone an extinction risk assessment using the *IUCN Red List Categories and Criteria*.

Categories are summarized below.

Category	Code	Description
Extinct	EX	Taxa for which there is no reasonable doubt that the last individual has died.
Extinct in the Wild	EW	Taxa which is known only to survive in cultivation, in captivity or and as a naturalised population well outside its past range and it has not been recorded in known or expected habitat despite exhaustive survey over a time frame appropriate to its life cycle and form.
Critically Endangered	CR	Taxa facing an extremely high risk of extinction in the wild.
Endangered	EN	Taxa facing a very high risk of extinction in the wild.
Vulnerable	VU	Taxa facing a high risk of extinction in the wild.
Near Threatened	NT	Taxa which has been evaluated but does not qualify for CR, EN or VU now but is close to qualifying or likely to qualify in the near future.
Least Concern	LC	Taxa which has been evaluated but does not qualify for CR, EN, VU, or NT but is likely to qualify for NT in the near future.
Data Deficient	DD	Taxa for which there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status.
Not Evaluated	NE	Taxa which has not been evaluated.

A full list of categories and their meanings are available at:

<https://www.iucnredlist.org/resources/categories-and-criteria>

APPENDIX B
NATUREMAP DATABASE SEARCH
AND
PROTECTED MATTERS SEARCH TOOL RESULTS

Naturemaps Database Search 20km Buffer - December 2022
Conservation Significant Species

Common	Taxon	Class	WAstatus	EPBCstatus
Carter's Freshwater Mussel	Westralunio carteri	Invert	VU	VU
mud minnow, western dwarf galaxias	Galaxiella munda	FISH	VU	
black-stripe minnow, black-striped dwarf galaxias	Galaxiella nigrostriata	FISH	EN	EN
Balston's pygmy perch	Nannatherina balstoni	FISH	VU	VU
Australasian bittern	Botaurus poiciloptilus	BIRD	EN	EN
Muir's corella	Cacatua pastinator pastinator	BIRD	CD	
Sharp-tailed sandpiper	Calidris acuminata	BIRD	MI	MI
curlew sandpiper	Calidris ferruginea	BIRD	CR	MI
Red-necked stint	Calidris ruficollis	BIRD	MI	MI
Long-toed Stint	Calidris subminuta	BIRD	MI	MI
forest red-tailed black cockatoo	Calyptorhynchus banksii naso	BIRD	VU	VU
Baudin's cockatoo	Calyptorhynchus baudinii	BIRD	EN	EN
Carnaby's cockatoo	Calyptorhynchus latirostris	BIRD	EN	EN
Peregrine falcon	Falco peregrinus	BIRD	OS	
Australian little bittern	Ixobrychus dubius	BIRD	P4	
malleefowl	Leipoa ocellata	BIRD	VU	VU
Blue-billed duck	Oxyura australis	BIRD	P4	
Osprey	Pandion haliaetus	BIRD	MI	MI
hooded plover, hooded dotterel	Thinornis rubricollis	BIRD	P4	
Wood sandpiper	Tringa glareola	BIRD	MI	MI
Common greenshank	Tringa nebularia	BIRD	MI	MI
masked owl (southwest)	Tyto novaehollandiae novaehollandiae	BIRD	P3	
woylie, brush-tailed bettong	Bettongia penicillata ogilbyi	MAMMAL	CR	EN
chuditch, western quoll	Dasyurus geoffroii	MAMMAL	VU	VU
western false pipistrelle, western falsistrelle	Falsistrellus mackenziei	MAMMAL	P4	
Water-rat, rakali	Hydromys chrysogaster	MAMMAL	P4	
quenda, southwestern brown bandicoot	Isoodon fusciventer	MAMMAL	P4	
bilby, dalgylte, ninu	Macrotis lagotis	MAMMAL	VU	VU
numbat, walpurti	Myrmecobius fasciatus	MAMMAL	EN	EN
tamar wallaby	Notamacropus eugenii derbianus	MAMMAL	P4	
western brush wallaby	Notamacropus irma	MAMMAL	P4	
south-western brush-tailed phascogale, wambenger	Phascogale tapoatafa wambenger	MAMMAL	CD	
western ringtail possum, ngwayir	Pseudocheirus occidentalis	MAMMAL	CR	CR
Quokka	Setonix brachyurus	MAMMAL	VU	VU

Naturemap Database Search 20km Buffer - December 2022

Scientific Name	COUNT
FROGS	
<i>Crinia georgiana</i>	37
<i>Crinia glauerti</i>	22
<i>Crinia insignifera</i>	45
<i>Crinia pseudinsignifera</i>	1
<i>Geocrinia leai</i>	6
<i>Heleioporus barycragus</i>	1
<i>Heleioporus eyrei</i>	61
<i>Heleioporus inornatus</i>	7
<i>Limnodynastes dorsalis</i>	9
<i>Litoria adelaidensis</i>	7
<i>Litoria moorei</i>	1
<i>Pseudophryne guentheri</i>	21
BIRDS	
<i>Acanthiza apicalis</i>	121
<i>Acanthiza chrysorrhoa</i>	80
<i>Acanthiza inornata</i>	26
<i>Acanthorhynchus superciliosus</i>	37
<i>Accipiter cirrocephalus</i>	4
<i>Accipiter cirrocephalus</i> subsp. <i>cirrocephalus</i>	2
<i>Accipiter fasciatus</i>	5
<i>Accipiter fasciatus</i> subsp. <i>fasciatus</i>	1
<i>Acrocephalus australis</i>	21
<i>Aegotheles cristatus</i>	5
<i>Aegotheles cristatus</i> subsp. <i>cristatus</i>	2
<i>Anas castanea</i>	1
<i>Anas gracilis</i>	100
<i>Anas rhynchotis</i>	31
<i>Anas superciliosa</i>	198
<i>Anhinga melanogaster</i>	35
<i>Anhinga novaehollandiae</i>	4
<i>Anthochaera carunculata</i>	123
<i>Anthochaera lunulata</i>	16
<i>Anthus australis</i> subsp. <i>australis</i>	1
<i>Aquila audax</i>	13
<i>Ardea alba</i> subsp. <i>modesta</i>	34
<i>Ardea garzetta</i> subsp. <i>nigripes</i>	3
<i>Ardea ibis</i> subsp. <i>coromanda</i>	1
<i>Ardea modesta</i>	5
<i>Ardea novaehollandiae</i>	76
<i>Ardea pacifica</i>	16
<i>Ardea sacra</i>	1
<i>Ardeotis australis</i>	1
<i>Artamus cinereus</i>	22
<i>Artamus cyanopterus</i>	21
<i>Atrichornis clamosus</i>	36
<i>Aythya australis</i>	30
<i>Barnardius zonarius</i>	103

<i>Biziura lobata</i>	50
<i>Botaurus poiciloptilus</i>	1
<i>Burhinus grallarius</i>	2
<i>Cacatua galerita</i> subsp. <i>galerita</i>	6
<i>Cacatua roseicapilla</i>	9
<i>Cacatua sanguinea</i>	12
<i>Cacomantis flabelliformis</i>	27
<i>Cacomantis pallidus</i>	5
<i>Calidris ruficollis</i>	1
<i>Calyptorhynchus banksii</i>	114
<i>Calyptorhynchus banksii</i> subsp. <i>naso</i>	142
<i>Calyptorhynchus baudinii</i>	40
<i>Calyptorhynchus latirostris</i>	284
<i>Calyptorhynchus</i> sp.	6
<i>Calyptorhynchus</i> sp. 'white-tailed black cockatoo'	11
<i>Charadrius melanops</i>	14
<i>Charadrius ruficapillus</i>	2
<i>Chenonetta jubata</i>	88
<i>Chroicocephalus novaehollandiae</i>	2
<i>Chrysococcyx basalis</i>	2
<i>Chrysococcyx lucidus</i>	8
<i>Chrysococcyx lucidus</i> subsp. <i>plagosus</i>	2
<i>Cincloramphus mathewsi</i>	2
<i>Circus approximans</i>	13
<i>Cladorhynchus leucocephalus</i>	4
<i>Climacteris rufa</i>	11
<i>Colluricincla harmonica</i>	47
<i>Colluricincla harmonica</i> subsp. <i>rufiventris</i>	1
<i>Columba livia</i>	1
<i>Coracina maxima</i>	1
<i>Coracina novaehollandiae</i>	68
<i>Coracina novaehollandiae</i> subsp. <i>novaehollandiae</i>	5
<i>Corvus bennetti</i>	3
<i>Corvus coronoides</i>	210
<i>Coturnix pectoralis</i>	1
<i>Cracticus tibicen</i>	160
<i>Cracticus tibicen</i> subsp. <i>dorsalis</i>	56
<i>Cracticus torquatus</i>	45
<i>Cygnus atratus</i>	58
<i>Dacelo novaeguineae</i>	113
<i>Dacelo novaeguineae</i> subsp. <i>novaeguineae</i>	2
<i>Daphoenositta chrysoptera</i>	19
<i>Dromaius novaehollandiae</i>	11
<i>Egretta novaehollandiae</i>	22
<i>Elanus axillaris</i>	3
<i>Elanus caeruleus</i>	1
<i>Elanus caeruleus</i> subsp. <i>axillaris</i>	1
<i>Elseyornis melanops</i>	4
<i>Eolophus roseicapillus</i>	7
<i>Eopsaltria australis</i> subsp. <i>griseogularis</i>	1
<i>Eopsaltria georgiana</i>	89

<i>Eopsaltria griseogularis</i>	6
<i>Epthianura albifrons</i>	4
<i>Erythrogonys cinctus</i>	4
<i>Falco berigora</i>	3
<i>Falco cenchroides</i>	28
<i>Falco longipennis</i>	2
<i>Falco peregrinus</i>	2
<i>Fulica atra</i>	20
<i>Fulica atra</i> subsp. <i>australis</i>	74
<i>Gallinula tenebrosa</i>	1
<i>Gallinula tenebrosa</i> subsp. <i>tenebrosa</i>	28
<i>Gallinula ventralis</i>	3
<i>Gallirallus philippensis</i>	4
<i>Gallirallus philippensis</i> subsp. <i>mellori</i>	1
<i>Gavicalis virescens</i>	3
<i>Gerygone fusca</i>	167
<i>Glossopsitta porphyrocephala</i>	5
<i>Glyciphila melanops</i>	1
<i>Grallina cyanoleuca</i>	52
<i>Haematopus fuliginosus</i>	1
<i>Haematopus longirostris</i>	2
<i>Haliaeetus leucogaster</i>	1
<i>Haliastur sphenurus</i>	10
<i>Hamirostra isura</i>	1
<i>Hieraaetus morphnoides</i>	4
<i>Himantopus himantopus</i>	26
<i>Hirundo neoxena</i>	35
<i>Larus novaehollandiae</i> subsp. <i>novaehollandiae</i>	27
<i>Lichenostomus ornatus</i>	1
<i>Lichenostomus virescens</i>	26
<i>Lichmera indistincta</i>	186
<i>Limosa lapponica</i>	1
<i>Lophoictinia isura</i>	1
<i>Malacorhynchus membranaceus</i>	12
<i>Malurus elegans</i>	51
<i>Malurus lamberti</i>	1
<i>Malurus pulcherrimus</i>	1
<i>Malurus splendens</i>	170
<i>Megalurus gramineus</i>	10
<i>Melanodryas cucullata</i>	2
<i>Melithreptus brevirostris</i>	3
<i>Melithreptus brevirostris</i> subsp. <i>leucogenys</i>	2
<i>Melithreptus chloropsis</i>	6
<i>Melithreptus lunatus</i>	28
<i>Merops ornatus</i>	24
<i>Microcarbo melanoleucos</i>	12
<i>Microeca fascinans</i>	3
<i>Myiagra inquieta</i>	2
<i>Neophema elegans</i>	6
<i>Ninox novaeseelandiae</i>	10
<i>Numenius madagascariensis</i>	1

<i>Nycticorax caledonicus</i>	11
<i>Nymphicus hollandicus</i>	2
<i>Ocyphaps lophotes</i>	31
<i>Oxyura australis</i>	23
<i>Pachycephala pectoralis</i>	110
<i>Pachycephala pectoralis</i> subsp. <i>fuliginosa</i>	1
<i>Pachycephala rufiventris</i>	82
<i>Pachyptila belcheri</i>	1
<i>Pachyptila desolata</i>	1
<i>Pachyptila vittata</i>	1
<i>Pandion haliaetus</i>	3
<i>Pardalotus punctatus</i>	37
<i>Pardalotus striatus</i>	129
<i>Pardalotus striatus</i> subsp. <i>westraliensis</i>	1
<i>Pelecanus conspicillatus</i>	24
<i>Petrochelidon nigricans</i>	44
<i>Petroica boodang</i>	66
<i>Petroica goodenovii</i>	6
<i>Petroica multicolor</i>	5
<i>Petroica multicolor</i> subsp. <i>campbelli</i>	2
<i>Phalacrocorax carbo</i>	22
<i>Phalacrocorax melanoleucos</i>	56
<i>Phalacrocorax sulcirostris</i>	51
<i>Phalacrocorax varius</i>	12
<i>Phaps chalcoptera</i>	52
<i>Phaps elegans</i>	3
<i>Phylidonyris albifrons</i>	1
<i>Phylidonyris melanops</i>	1
<i>Phylidonyris niger</i>	4
<i>Phylidonyris novaehollandiae</i>	137
<i>Platalea flavipes</i>	36
<i>Platycercus icterotis</i>	46
<i>Platycercus icterotis</i> subsp. <i>icterotis</i>	16
<i>Platycercus spurius</i>	13
<i>Platycercus zonarius</i>	30
<i>Platycercus zonarius</i> subsp. <i>semitorquatus</i>	2
<i>Platycercus zonarius</i> subsp. <i>semitorquatus</i> (twenty-eight parrot)	1
<i>Plegadis falcinellus</i>	3
<i>Podargus strigoides</i>	18
<i>Podargus strigoides</i> subsp. <i>brachypterus</i>	2
<i>Podiceps cristatus</i>	8
<i>Poliocephalus poliocephalus</i>	25
<i>Polytelis anthopeplus</i>	6
<i>Porphyrio porphyrio</i>	6
<i>Porphyrio porphyrio</i> subsp. <i>bellus</i>	45
<i>Porzana fluminea</i>	1
<i>Porzana pusilla</i> subsp. <i>palustris</i>	1
<i>Porzana tabuensis</i>	7
<i>Purpureicephalus spurius</i>	63
<i>Recurvirostra novaehollandiae</i>	5
<i>Rhipidura albiscapa</i>	181

Rhipidura fuliginosa	91
Rhipidura fuliginosa subsp. preissi	1
Rhipidura leucophrys	85
Rhipidura leucophrys subsp. leucophrys	2
Sericornis frontalis	72
Smicrornis brevirostris	47
Stagonopleura oculata	13
Sterna bergii	2
Sterna caspia	1
Stictonetta naevosa	2
Strepera versicolor	32
Streptopelia chinensis	3
Streptopelia senegalensis	18
Tachybaptus novaehollandiae	12
Tachybaptus novaehollandiae subsp. novaehollandiae	54
Tadorna tadornoides	97
Thinornis rubricollis	18
Threskiornis molucca	82
Threskiornis spinicollis	56
Todiramphus sanctus	17
Trichoglossus haematodus	4
Tringa brevipes	1
Tringa glareola	1
Tringa hypoleucos	5
Tringa nebularia	4
Turnix varia	2
Turnix varius	1
Tyto alba subsp. delicatula	7
Tyto novaehollandiae	1
Vanellus miles	1
Zosterops lateralis	133
FISH	
Bostockia porosa	5
Carassius auratus	1
Edelia vittata	1
Galaxias occidentalis	9
Gambusia affinis	1
Geotria australis	2
Gonorynchus greyi	1
Hyporhamphus regularis	1
Nannoperca vittata	5
Siphonognathus argyrophanes	1
INVERTEBRATES (FILTERED)	
Westralunio carteri	3
MAMMALS	
Antechinus flavipes subsp. leucogaster	25
Bettongia penicillata subsp. ogilbyi	29
Cercartetus concinnus	5
Chalinolobus gouldii	6
Chalinolobus morio	3
Dasyurus geoffroii	53

<i>Equus caballus</i>	1
<i>Falsistrellus mackenziei</i>	11
<i>Felis catus</i>	1
<i>Hydromys chrysogaster</i>	11
<i>Isoodon fusciventer</i>	21
<i>Isoodon obesulus</i>	25
<i>Isoodon obesulus subsp. fusciventer</i>	37
<i>Macropus fuliginosus</i>	125
<i>Macropus irma</i>	4
<i>Mormopterus planiceps</i>	3
<i>Mus musculus</i>	128
<i>Myrmecobius fasciatus</i>	4
<i>Notamacropus irma</i>	10
<i>Nyctophilus geoffroyi</i>	14
<i>Nyctophilus gouldi</i>	3
<i>Nyctophilus timoriensis</i>	3
<i>Oryctolagus cuniculus</i>	38
<i>Phascogale calura</i>	1
<i>Phascogale tapoatafa subsp. tapoatafa</i>	8
<i>Phascogale tapoatafa subsp. wambenger</i>	2
<i>Pseudomys albocinereus</i>	15
<i>Rattus rattus</i>	8
<i>Setonix brachyurus</i>	7
<i>Sminthopsis gilberti</i>	1
<i>Sminthopsis griseoventer</i>	24
<i>Sminthopsis griseoventer subsp. griseoventer</i>	1
<i>Sus scrofa</i>	6
<i>Tachyglossus aculeatus</i>	3
<i>Tadarida australis</i>	2
<i>Tarsipes rostratus</i>	24
<i>Trichosurus vulpecula</i>	7
<i>Trichosurus vulpecula subsp. vulpecula</i>	12
<i>Tursiops truncatus</i>	1
<i>Vespadelus regulus</i>	7
<i>Vulpes vulpes</i>	14
REPTILES	
<i>Acritoscincus trilineatum</i>	5
<i>Acritoscincus trilineatus</i>	3
<i>Aprasia repens</i>	3
<i>Brachyuropsis semifasciata</i>	11
<i>Chelodina colliei</i>	1
<i>Christinus marmoratus</i>	2
<i>Crenadactylus ocellatus</i>	1
<i>Crenadactylus ocellatus subsp. ocellatus</i>	1
<i>Cryptoblepharus buechananii</i>	12
<i>Cryptoblepharus plagiocephalus</i>	1
<i>Ctenophorus adelaidensis</i>	35
<i>Ctenotus australis</i>	1
<i>Ctenotus fallens</i>	28
<i>Ctenotus labillardieri</i>	8
<i>Ctenotus ora</i>	3

<i>Ctenotus schomburgkii</i>	7
<i>Delma fraseri</i>	2
<i>Demansia psammophis</i> subsp. <i>reticulata</i>	1
<i>Diplodactylus polyophthalmus</i>	5
<i>Egernia depressa</i>	1
<i>Egernia kingii</i>	2
<i>Egernia napoleonis</i>	10
<i>Elapognathus coronatus</i>	6
<i>Hemiergis gracilipes</i>	2
<i>Hemiergis initialis</i>	4
<i>Hemiergis initialis</i> subsp. <i>initialis</i>	8
<i>Hemiergis quadrilineata</i>	8
<i>Lerista christinae</i>	5
<i>Lerista distinguenda</i>	16
<i>Lerista elegans</i>	22
<i>Lerista microtis</i> subsp. <i>microtis</i>	2
<i>Lerista praepedita</i>	11
<i>Lialis burtonis</i>	11
<i>Liopholis pulchra</i> subsp. <i>pulchra</i>	8
<i>Lissolepis luctuosa</i>	3
<i>Menetia greyii</i>	28
<i>Morelia spilota</i> subsp. <i>imbricata</i>	3
<i>Morethia butleri</i>	2
<i>Morethia lineoocellata</i>	6
<i>Morethia obscura</i>	54
<i>Neelaps bimaculatus</i>	6
<i>Nephurus milii</i>	1
<i>Notechis scutatus</i>	19
<i>Parasuta gouldii</i>	6
<i>Parasuta nigriceps</i>	5
<i>Pogona minor</i>	26
<i>Pogona minor</i> subsp. <i>minor</i>	1
<i>Pseudonaja affinis</i>	1
<i>Pseudonaja affinis</i> subsp. <i>affinis</i>	33
<i>Pseudonaja mengdeni</i>	1
<i>Pygopus lepidopodus</i>	12
<i>Ramphotyphlops australis</i>	19
<i>Ramphotyphlops pinguis</i>	1
<i>Simoselaps bertholdi</i>	2
<i>Strophurus spinigerus</i>	17
<i>Tiliqua rugosa</i>	19
<i>Tiliqua rugosa</i> subsp. <i>aspera</i>	1
<i>Tiliqua rugosa</i> subsp. <i>rugosa</i>	1
<i>Underwoodisaurus milii</i>	4
<i>Varanus gouldii</i>	4
<i>Varanus rosenbergi</i>	1
<i>Varanus tristis</i> subsp. <i>tristis</i>	2
Grand Total	9261



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 08-Feb-2023

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	17
Listed Migratory Species:	7

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <https://www.dcceew.gov.au/parks-heritage/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	10
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	1
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	3
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Species [\[Resource Information \]](#)

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Zanda baudinii listed as Calyptorhynchus baudinii Baudin's Black-Cockatoo, Long-billed Black-cockatoo [87736]	Endangered	Breeding likely to occur within area
Zanda latirostris listed as Calyptorhynchus latirostris Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Breeding likely to occur within area
MAMMAL		
Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat may occur within area
Dasyurus geoffroi Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Myrmecobius fasciatus Numbat [294]	Endangered	Translocated population known to occur within area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat likely to occur within area
Setonix brachyurus Quokka [229]	Vulnerable	Species or species habitat may occur within area

PLANT

Andersonia annelsii [84925]	Critically Endangered	Species or species habitat may occur within area
Caladenia christineae Christine's Spider Orchid [56716]	Vulnerable	Species or species habitat likely to occur within area
Caladenia harringtoniae Harrington's Spider-orchid, Pink Spider-orchid [56786]	Vulnerable	Species or species habitat likely to occur within area
Diuris drummondii Tall Donkey Orchid [4365]	Vulnerable	Species or species habitat may occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat may occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species

[[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area

Migratory Terrestrial Species

Scientific Name	Threatened Category	Presence Text
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]		
Protected Area Name	Reserve Type	State
Tone-Perup	Nature Reserve	WA

Regional Forest Agreements [Resource Information]	
Note that all areas with completed RFAs have been included.	
RFA Name	State
South West WA RFA	Western Australia

EPBC Act Referrals [Resource Information]			
Title of referral	Reference	Referral Outcome	Assessment Status

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Not controlled action			
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Not controlled action (particular manner)			
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact us](#) page.

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APPENDIX C

OBSERVED FAUNA LISTING

Fauna Observed During Survey Period

Mordalup Bridge

Compiled by Greg Harewood - Dec 2022

Class Family Species	Common Name	Conservation Status
Osteichthyes		
Poeciliidae Livebearers		
<i>Gambusia holbrooki</i>	Mosquito Fish	Introduced
Reptilia		
Scincidae Skinks		
<i>Egernia kingii</i>	King's Skink	LC
Aves		
Psittacidae Parrots		
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black-Cockatoo	VU Bp LC
<i>Zanda baudinii</i>	Baudin's Black Cockatoo	EN Bp CR
Halcyonidae Tree Kingfishers		
<i>Dacelo novaeguinea</i>	Laughing Kookaburra	Introduced
Maluridae Fairy Wrens, GrassWrens		
<i>Malurus splendens</i>	Splendid Fairy-wren	Bh LC
Acanthizidae Thornbills, Geryones, Fieldwrens & Whitefaces		
<i>Gerygone fusca</i>	Western Gerygone	LC
Pachycephalidae Crested Shrike-tit, Crested Bellbird, Shrike Thrushes, Whistlers		
<i>Pachycephala occidentalis</i>	Western Whistler	Bh LC
Dicruridae Monarchs, Magpie Lark, Flycatchers, Fantails, Drongo		
<i>Rhipidura fuliginosa</i>	Grey Fantail	LC

BC Act Status/EPBC Act Status - CR = Critically Endangered, EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA Priority Status - P1 to P4, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern, NT = Near Threatened - see <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status
Campephagidae Cuckoo-shrikes, Trillers		
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	LC
Cracticidae Currawongs, Magpies & Butcherbirds		
<i>Strepera versicolor</i>	Grey Currawong	Bp LC
Mammalia		
Dasyuridae Carnivorous Marsupials		
<i>Dasyurus geoffroii</i>	Western Quoll, Chuditch	VU VU NT
Phalangeridae Brush-tail Possums, Cuscuses		
<i>Trichosurus vulpecula vulpecula</i>	Common Brushtail Possum	LC
Pseudocheiridae Ringtail Possums		
<i>Pseudocheirus occidentalis</i>	Western Ringtail Possum	CR CR CR
Potoroidae Potoroos, Bettongs		
<i>Bettongia penicillata ogilbyi</i>	Brush-tailed Bettong, Woylie	CR EN CR

BC Act Status/EPBC Act Status - CR = Critically Endangered, EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA Priority Status - P1 to P4, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern, NT = Near Threatened - see <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

APPENDIX D

HABITAT TREE DETAILS

Habitat Trees

DBH >50cm

Datum - GDA2020

Entrance Size Ranges: Small = <5cm, Medium = 5-<10cm, Large = 10cm+

Waypoint Number	Zone	mE	mN	Side of Road	Tree Species	DBH (cm) Measured	Tree Height (m)	Number of Hollows	Estimated Size of Hollow Entrance	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	MRWA Category	Comments
wpt001	50H	460253	6202225	E	Flooded Gum	117	15-20	2+	Small & Medium	No Signs	No Signs	No	6	Several small/medium spout type hollows. Examined with drone, none with any depth - entrances and accommodating structures too small
wpt002	50H	460254	6202221	E	Jarraah	73	15-20	0				No	7	
wpt003	50H	460462	6202009	W	Jarraah	87	15-20	0				No	7	
wpt004	50H	460460	6202007	W	Dead Jarraah	73	15-20	2+	Medium	No Signs	No Signs	No	6	Knot holes into small branches/trunk - accommodating structures too small internally
wpt005	50H	460455	6202007	W	Marri	160	15-20	2+	Small, Medium & Large	No Signs	No Signs	No	6	Large short chimney on side trunk - too shallow/exposed. Some possible other small/medium hollows - accommodating structures too small internally
wpt006	50H	460414	6202024	W	Marri	123	20+	2+	Small & Medium	No Signs	No Signs	No	6	Knot holes/spouts in small branches/trunk - entrances and/or accommodating structures too small
wpt007	50H	460419	6202034	W	Jarraah	56	15-20	0					7	
wpt008	50H	460399	6202028	W	Dead Jarraah	61	10-15	0					7	
wpt009	50H	460400	6202048	W	Marri	59	15-20	0					7	
wpt010	50H	460381	6202056	W	Jarraah	64	15-20	0					7	
wpt011	50H	460383	6202062	W	Jarraah	59	15-20	0					7	
wpt012	50H	460383	6202066	W	Jarraah	53	15-20	0					7	
wpt013	50H	460360	6202053	W	Dead Jarraah	71	15-20	0					7	
wpt014	50H	460360	6202062	W	Jarraah	78	15-20	0					7	
wpt015	50H	460360	6202071	W	Jarraah	82	15-20	0					7	
wpt016	50H	460361	6202074	W	Jarraah	80	15-20	0					7	
wpt017	50H	460366	6202075	W	Jarraah	65	10-15	1	Small	No Signs	No Signs	No	6	One small sized fissure - entrances and accommodating structure too small
wpt018	50H	460340	6202076	W	Jarraah	60	10-15	0					7	
wpt019	50H	460331	6202067	W	Marri	138	15-20	2+	Small, Medium & Large	No Signs	No Signs	No	6	Several medium/large spouts. Examined with drone, none with any depth - entrances and/or accommodating structures too small
wpt020	50H	460337	6202093	W	Marri	93	15-20	0					7	
wpt021	50H	460297	6202101	W	Dead Flooded Gum	61	10-15	2+	Small & Medium	No Signs	No Signs	No	6	Knot holes/spouts in small branches/trunk - entrances and accommodating structures too small internally
wpt022	50H	460280	6202124	W	Marri	61	15-20	0					7	
wpt023	50H	460279	6202125	W	Flooded Gum	80	15-20	0					7	
wpt024	50H	460306	6202140	W	Flooded Gum	59	15-20	0					7	
wpt025	50H	460302	6202147	W	Flooded Gum	67	15-20	0					7	
wpt026	50H	460289	6202148	W	Jarraah	96	15-20	0					7	
wpt027	50H	460283	6202141	W	Marri	52	15-20	0					7	
wpt028	50H	460270	6202167	W	Marri	58	15-20	0					7	
wpt029	50H	460217	6202223	W	Jarraah	59	15-20	0					7	
wpt030	50H	460246	6202205	W	Jarraah	68	15-20	0					7	

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