Perth
2 Bulwer Street
Perth WA 6000
T (08) 9227 2600
F (08) 9227 2699

Albany
Unit 7/ 57 -59
Lockyer Avenue
Albany WA 6330
T 0447446343

FLAT ROCKS WIND FARM TURBINE TRANSPORT

TEC AND BLACK COCKATOO RECONNAISSANCE, LUMEAH

Prepared For: Rex J Andrews Pty Ltd
Po Box 271 PENRITH
NSW 2751

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EXECUTIVE SUMMARY

Rex J Andrews Pty Ltd is facilitating the delivery of wind turbine blades as part of the Flat Rocks Wind Farm Project in the shires of Kojonup and Broomehill-Tambellup. The transport of the turbine blades will require road modification at the intersection of Albany Highway and Warrenup Road, Lumeah.

Rex J Andrews Pty Ltd commissioned Aurora Environmental to complete a reconnaissance habitat assessment for Black Cockatoos and assess the site for the Commonwealth-listed *Eucalypt Woodlands of the Western Australian Wheatbelt* Threatened Ecological Community. This was undertaken on 21 November 2022.

The conclusions and recommendations of the survey are provided below:

Black Cockatoos

- The trees within the survey area were not of sufficient size to meet the criteria of potential habitat trees.
- The vegetation is of low foraging quality for Black Cockatoos.
- Black Cockatoo habitat will not be significantly impacted by the project.

Wheatbelt TEC

- The patch on the western side of Albany Highway does not comprise Wheatbelt TEC but is within 50 m of vegetation that does meet the criteria for Wheatbelt TEC (along the western side of the highway) and therefore is considered part of the buffer area of the TEC.
- The patch on the eastern side of Albany Highway but to the south of Warrenup Road does not comprise Wheatbelt TEC.
- The patch on the eastern side of Albany Highway **does** meet the criteria of the Wheatbelt TEC in very good condition.

Recommendations

- Given that the vegetation either comprises Wheatbelt TEC or buffer vegetation for Wheatbelt TEC, Main Roads have advised that a clearing permit will be required for the removal of the trees. If possible, the trees should be retained to remove the need for a native vegetation clearing application with DWER.
- If tree removal is required, the stumps should remain to a height of at least 1 m to allow them to regrow and just be pruned as required.
- Impact to most of the vegetation will be minimised by allowing it to regrow after pruning and just continuing to trim as required in the future.
- The eastern side of Albany Highway should be cleared/trimmed prior to the western side to reduce weed transmittal.
- Cleared and trimmed vegetation should be mulched and re-spread through the area on the side of the highway from which it was cleared. This will encourage revegetation, reduce

erosion and suppress weeds. Although the vegetation on the western side of the highway comprises many species not part of the Wheatbelt TEC, the tall vegetation is still native to the area and can be safely used as mulching material.

- All personnel, vehicles, equipment and tools should be clean and free from mud, vegetation and soil to reduce weeds to prevent pathogen spread.

1 INTRODUCTION

1.1 PROJECT BACKGROUND

Rex J Andrews Pty Ltd (RJA) is facilitating the delivery of wind turbine blades from Bunbury Port to Kojonup as part of the Flat Rocks Wind Farm Project in the shires of Kojonup and Broomehill-Tambellup in the Great Southern Region of Western Australia. The transport of the turbine blades will require road modification at some locations to allow for the extra-long load. The subject of this report is the intersection of Albany Highway and Warrenup Road, Lumeah (Figure 1). Large trees will be removed and any other vegetation taller than 2.2 m will be trimmed to allow for the swing of the blade through the intersection (Figure 2).

Risk analysis of the survey area indicated the possibility of the Black Cockatoo breeding habitat and the Commonwealth-listed *Eucalypt Woodlands of the Western Australian Wheatbelt* Threatened Ecological Community (Wheatbelt TEC).

RJA commissioned Aurora Environmental (Aurora) to complete a reconnaissance habitat assessment for Black Cockatoos and assess the site for the Wheatbelt TEC. This was undertaken on 21 November 2022.

1.2 PURPOSE AND SCOPE OF WORK

The purpose of the project was to identify any significant habitat trees for Black Cockatoos and assess the vegetation to determine whether it comprised the Wheatbelt TEC. The scope of the work included:

- A desktop assessment to gather contextual information at the local scale utilising available sources of literature, data and map-based information for the site.
- A reconnaissance survey to:
    - Verify the accuracy of the desktop assessment with a focus on Black Cockatoo habitat.
    - Identify the likelihood of habitat (including foraging, roosting or breeding) that would indicate the use of the area by black cockatoos.
    - Assess the vegetation for key diagnostic characteristics that would indicate whether the vegetation is part of the Wheatbelt TEC.
    - Identify the potential impacts and make management recommendations.

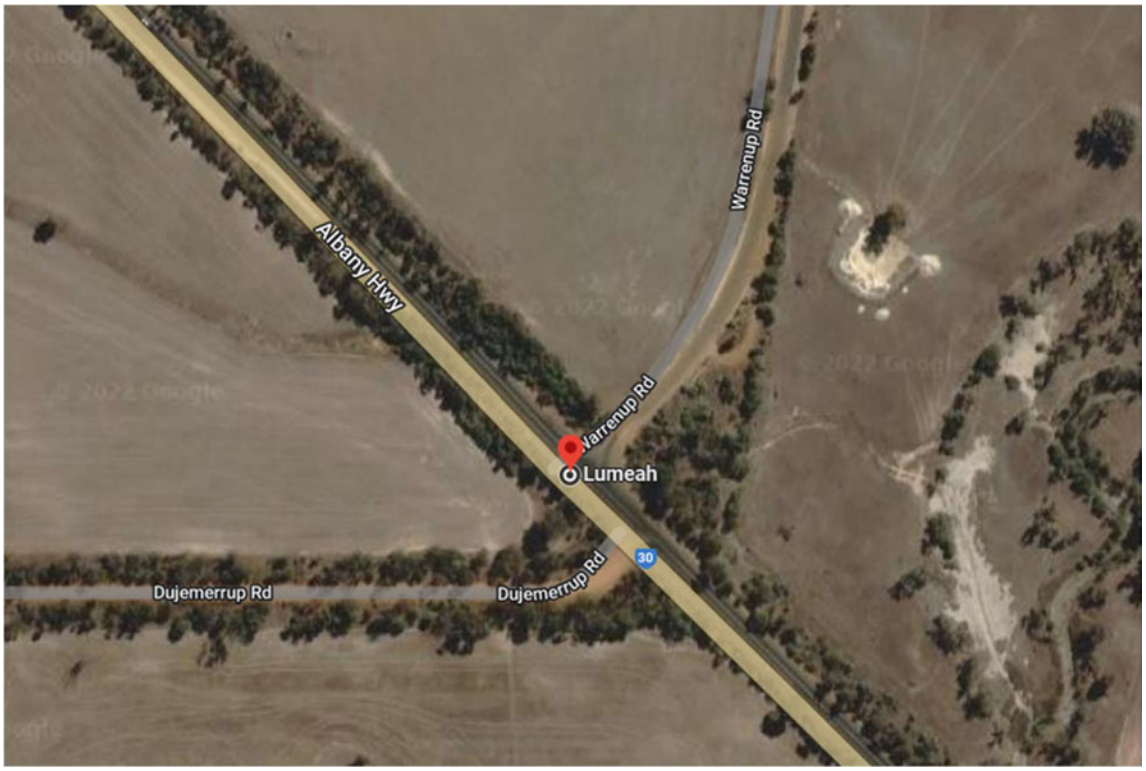
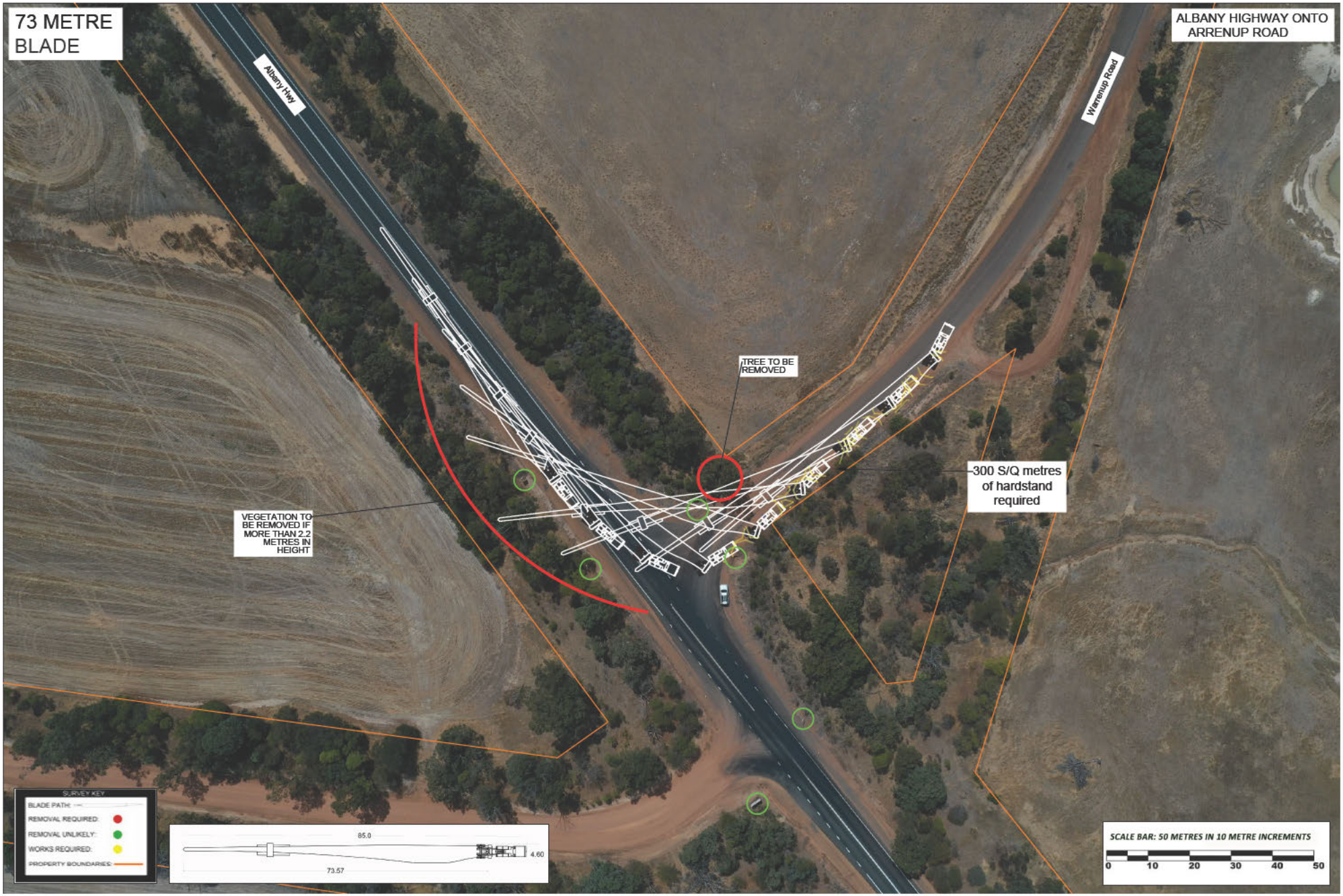


FIGURE 1: LOCATION OF SURVEY AREA. INTERSECTION OF ALBANY HIGHWAY AND WARRENUP ROAD, LUMEAH


73 METRE
BLADE
ALBANY HIGHWAY ONTO
ARRENUP ROAD
Albany Hwy
Warrenup Road
TREE TO BE
REMOVED
300 S/Q metres
of hardstand
required
VEGETATION TO
BE REMOVED IF
MORE THAN 2.2
METRES IN
HEIGHT
SURVEY KEY
BLADE PATH:
REMOVAL REQUIRED:
REMOVAL UNLIKELY:
WORKS REQUIRED:
PROPERTY BOUNDARIES:
85.0
4.60
73.57
SCALE BAR: 50 METRES IN 10 METRE INCREMENTS
0
10
20
30
40
50

2 SITE CHARACTERISTICS

2.1 LAND USE

The survey area is situated at the intersection of Albany Highway and Warrenup Road, Lumeah and approximately 50 m northwest of the intersection between Albany Highway and Dujemerrup Road. Albany Highway is a 405 km sealed road linking Perth to Albany. It is predominantly a single carriage way with regular overtaking lanes.

Warrenup Road is a predominantly sealed road that travels east from Albany Highway and terminates at Broomehill-Kojonup Road, Broomehill West, approximately 20 km north of Broomehill Village.

The survey area is within the roadside reserve along Albany highway and surrounded by farmland primarily used for cropping of cereals and legumes (Landgate 2022, Department of Primary Industry and Regional Development; DPIRD-003).

2.2 ABORIGINAL HERITAGE

The survey area is within the Tunney fish traps (Site 962) listed Aboriginal Heritage Site and adjacent to the Tunney Wilgie Site (Site 4925; Figure 3). As the ground associated with the Sites will not be disturbed, an Aboriginal heritage study is not required.

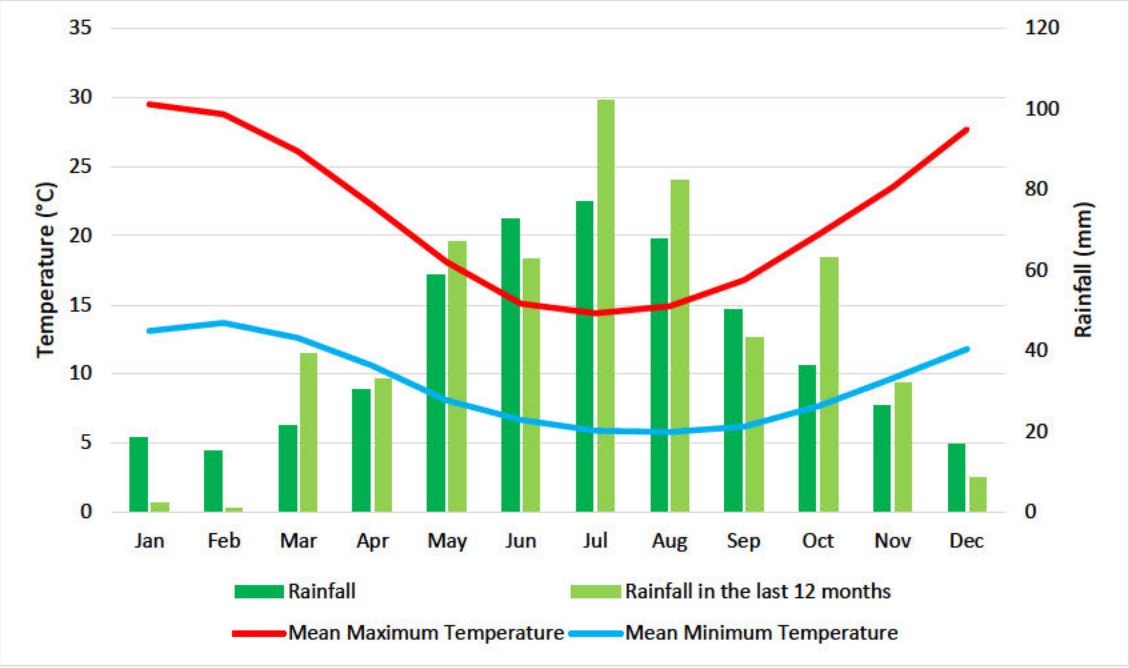
FIGURE 3: LOCATION OF ABORIGINAL HERTAGE SITES (DPLH 2022).

2.3 PHYSICAL ENVIRONMENT

2.3.1 Climate

The survey area experiences a Mediterranean climate with hot, dry summers and cool, wet winters. The nearest weather records are from Kojonup Station (010582) located approximately 16 km west of the survey area. The average yearly rainfall for the area is 532 mm (BOM 2022).

Rainfall in the past 12 months has been variable with a drier than average summer but additional rainfall in March, July, August and October (Figure 4). Temperature data is not available from the Kojonup station for the last 12 months but data from the Katanning Station (010916; ~50 km away) shows negligible difference (<2 °C) between recorded monthly temperature averages from 2022 and the average statistics since 1999 (BOM 2022).



Source: Bureau of Meteorology (BOM) (2022) Climate Data Online. http://www.bom.gov.au/climate/data/

FIGURE 4: CLIMATE AVERAGES FOR KOJONUP (BOM 2022)

2.3.2 Geology

The survey area is part of the Yilgarn Craton, a tertiary plateau dissected by rivers (Beecham 2001) that extends over most of south-western Australia east of Perth and Geraldton to the Stirling Ranges (Department of Climate Change, Energy, the Environment and Water; DCCEEW 2015). The land is generally flat to undulating with occasional rocky outcrops and chains of saline wetlands and salt lakes (DCCEEW 2015).

The bedrock of the survey area is granitic rock which is undivided and metamorphosed (A-g-Y) (Landgate 2022; DMIRS-014,016).

2.3.3 Soils

The soils of the Avon Wheatbelt (zone of rejuvenated drainage) are formed in colluvium or in-situ weathered rock (Landgate 2022). The survey area is part of the Carrolup system and the Carrolup 6 subsystem (Table A).

TABLE A: SOIL CHARACTERISTICS

MAP UNIT	DESCRIPTION	DATASET REFERENCE
Southern Zone of Rejuvenated Drainage	Erosional surface of gently undulating rises to low hills. Continuous stream channels that flow in most years. Colluvial processes are active. Soils formed in colluvium or in-situ weathered rock (Landgate 2022).	DPIRD-017
Carrolup System	Undulating rises and low hills, in the southern Zone of Rejuvenated Drainage. Grey sandy duplex (deep and shallow) and shallow loamy duplex. Wandoo-sheoak-jam woodland (Landgate 2022).	DPIRD-064
Carrolup 6 subsystem	Broad valley flats and narrow alluvial plains, Carlecatup and Gordon Rivers. The flats are 300 to 1500m wide. Soils are mainly grey deep and shallow sandy duplex soils. Brown deep sands occur in small dunes along the river (Landgate 2022).	DPIRD-027

2.3.4 Surface Water and Catchments

The survey area is part of the Frankland River Basin in the Nornalup Inlet Frankland River catchment and the Slab Hut Gully sub catchment (DPIRD 2022a). Slab Hut Gully intersects Albany Highway 340 m southeast of the survey area. Slab Hut Gully is a tributary of the Gordon River which flows through agricultural areas of the Yilgarn Plateau before becoming the Frankland River just north of Muir Highway (Department of Environment 2004). The Gordon-Frankland River discharges into the Walpole-Nornalup Inlet (Department of Environment 2004). The upper part of the catchment (where the survey area is located) is becoming increasingly degraded and is prone to salinity (Department of Environment 2004).

2.4 BIOLOGICAL ENVIRONMENT

2.4.1 Interim Biogeographic Regionalisation of Australia (IBRA)

The Interim Biogeographic Regionalisation for Australia (IBRA version 7) divides the Australian continent into 89 bioregions and 419 subregions. IBRA regions represent a landscape-based approach to classifying the land surface, including attributes of climate, geomorphology, landform, lithology, and characteristic flora and fauna.

The survey area is within the Avon Wheatbelt bioregion and the Katanning (AVW02) subregion. The Katanning subregion is the subregion of Rejuvenated Drainage. It is an area of active drainage on the Yilgarn craton characterised by “proteaceous scrub-heaths rich in endemics on lateritic uplands and derived sandplains” (Beecham 2001).

The survey area is within 750 m of the Southern Jarrah Forest (JAF02) which comprises jarrah-marri forest on laterite gravels with wandoo-marri woodlands on clayey soils (Hearn *et al*. 2002).

2.4.2 Pre-European Vegetation

The pre-European vegetation dataset describes vegetation in relation to natural resource boundaries (Shepherd *et al.* 2002). The survey area intersects with the Tambellup pre-European vegetation complex characterised as scrub-heath with scattered tall shrubs of *Acacia* sp., Proteaceae and Myrtaceae (Landgate 2022, DPIRD-006).

2.4.3 Threatened Ecological Communities – Wheatbelt Woodlands

The Eucalypt Woodlands of the Western Australian (WA) Wheatbelt (Wheatbelt TEC) is a threatened ecological community (TEC) within the Avon Wheatbelt IBRA region (including both Merredin and Katanning subregions) and the Western Mallee IBRA subregion (Main Roads Western Australia; MRWA 2021). It is listed as Critically Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Priority 3 as a state priority ecological community (PEC) (Department of Biodiversity, Conservation and Attractions; DBCA 2022a).

The Wheatbelt TEC is a transitional community between the wetter forests along the Darling Range and southeast coast, and the low woodlands, shrublands and mallee of the semi-arid to arid zone (DCCEEW 2015). Although once widespread, it now mostly occurs as small, scattered remnants across the wheatbelt that are usually degraded and weedy (MRWA 2021). It comprises an open woodland with the tree canopy dominated by *Eucalyptus* species with a tree or mallet form (MRWA 2021). The Wheatbelt TEC is associated with the flatter areas of the Wheatbelt including drainage lines and saline areas in areas that receive between 300 – 600 mm of mean annual rainfall (DCCEEW 2015).

2.4.4 Black Cockatoos

Black Cockatoos are considered iconic species of the Wheatbelt region. The three species are protected under legislation and may occur in the survey area (DCCEEW 2015). Baudin's Black Cockatoo (*Zanda baudinii* (also known as *Calyptorhynchus baudinii*)) and Carnaby's Black Cockatoo (*Zanda latirostris* (also known as *Calyptorhynchus latirostris*)) are listed as Endangered under the EPBC Act and state legislation and the Red-Tailed Black Cockatoo (*Calyptorhynchus banksii naso*) is listed as Vulnerable (DBCA 2022b). The populations of all three species are declining and this is expected to continue (DAWE 2022).

Black Cockatoos rely on suitable breeding, roosting and foraging habitats for survival. Black Cockatoos nest in tree hollows which may take over 200 years to develop (Department of Agriculture, Water and the Environment; DAWE 2022). Roosting trees provide suitable habitat in the non-breeding season close to food and water resources and a safe place to rest at night (DAWE 2022). Both nesting and roosting trees are required to be within close proximity (12 km breeding, 20 km roosting) of suitable foraging habitat (DAWE 2022).

Habitat loss and fragmentation is the main cause of Black Cockatoo population decline, primarily from loss of suitable nesting trees and foraging habitat and their fragmentation from each other

(DAWE 2022). Black Cockatoos are considered a slow-breeding species (1 to 2 chicks per year) which means it is difficult to recover from population decline (DAWE 2022).

The Wheatbelt region is used by Carnaby's Cockatoo for breeding including areas of Wheatbelt TEC (DAWE 2022). Some parts of this region are also used by Baudin's Cockatoo and the Red-Tailed Black Cockatoo, especially if they are adjacent to the Jarrah Forest bioregion (DAWE 2022). Wheatbelt vegetation is highly fragmented and is poorly represented in conservation reserves (DAWE 2022). Available mapping shows the survey area is 1.3 km from buffered Black Cockatoo breeding sites (Figure 5) and within the confirmed breeding areas for Carnaby's Cockatoo within the Swan Coastal Plain and Jarrah Forest IBRA regions (survey area is within 750 m of the Jarrah Forest IBRA region) (Figure 6).

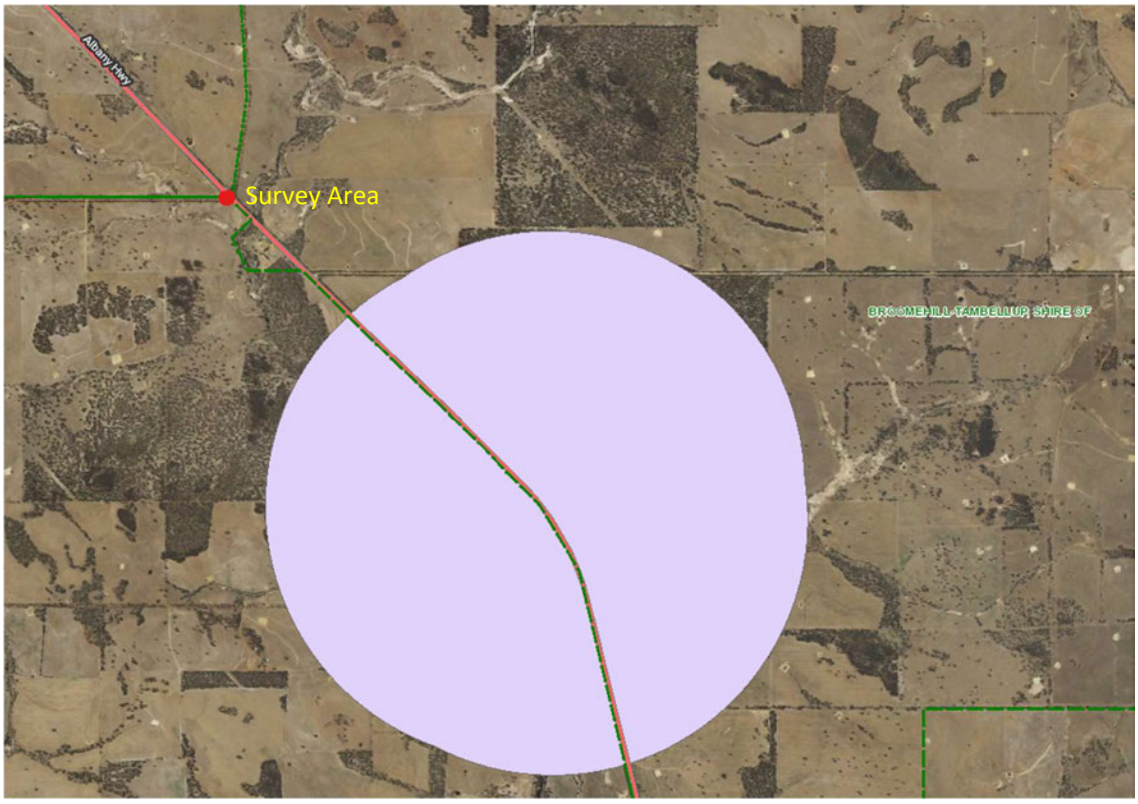


FIGURE 5: BLACK COCKATOO BREEDING SITES - BUFFERED (LANDGATE 2022; DBCA-063)

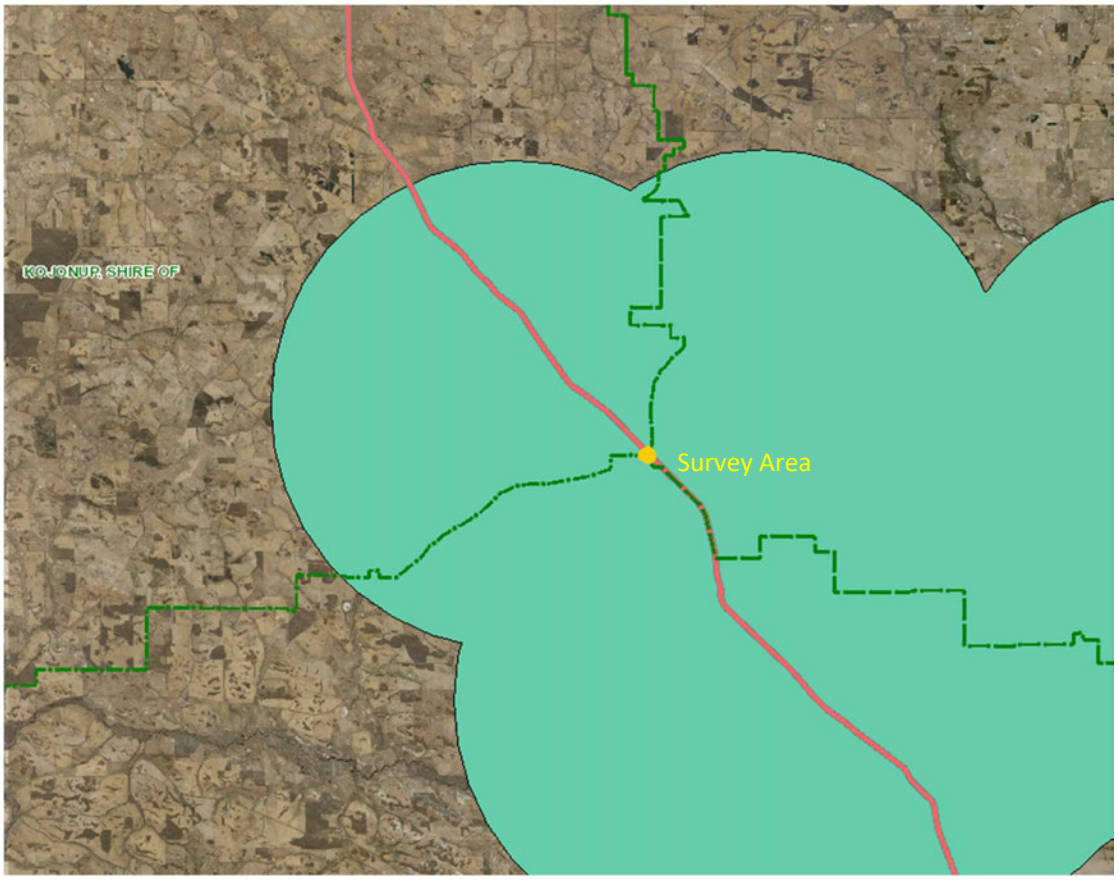


FIGURE 6: CARNABY'S COCKATOO CONFIRMED BREEDING AREAS (LANDGATE 2022; DBCA-054)

3 METHODS

3.1 DESKTOP ASSESSMENT

State and Commonwealth database searches were conducted to identify relevant environmental information pertaining to the survey area (Table B). Results were interpreted to provide context to the potential values and threats associated with the survey area. Consideration was given to the likelihood of the species being present based on mapped distribution, specimens formerly identified or presence of suitable habitat. Species that are exclusively marine or migratory were excluded.

TABLE B: DATABASE SEARCHES

DATABASE	DATE	SEARCH FOCUS	SEARCH RESULT
Atlas of Living Australia	10/11/2022	Previous flora and fauna records	Survey area + 5 km buffer
Protected Matters Search Tool	11/11/2022	Communities and species listed under the EPBC Act	Survey area + 5 km buffer
Threatened and Priority Fauna Database	4/11/2022	Protected Fauna Black Cockatoo spatial data	Survey area + 50 km buffer
Threatened Ecological Communities Database	4/11/2022	Threatened and priority ecological communities	Survey area + 20 km buffer

3.2 BLACK COCKATOO HABITAT ASSESSMENT

A Black Cockatoo habitat assessment was undertaken on 21 November 2022 to determine the likelihood that Black Cockatoos utilise the survey area for breeding or night roosting in accordance with the Referral Guidelines (DAWE 2022). The suitability of the site to provide foraging habitat was not assessed as the area to be disturbed is less than 1 ha (DAWE 2022).

Breeding Habitat

Assessment of black cockatoo breeding habitat involves the identification of all suitable breeding trees species within the survey area that have a diameter at breast height (DBH) of over 50 cm. Species such as Wandoo and Salmon Gums are considered potential habitat trees if the DBH is greater than 30 cm. If potential breeding trees are present, the DBH of each tree was measured using a pre-made gauge. The location of each potential breeding tree identified is recorded with a GPS and details of the tree species and the number and size of hollows (if any) are recorded. Target tree species include Marri, Jarrah and Karri or any other endemic *Corymbia/Eucalyptus* species of a suitable size that is present. Peppermint, *Banksia*, Sheoak and *Melaleuca* tree species (for example) are not assessed as they do not develop hollows that are used by black cockatoos.

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

> *Any tree which is alive or dead that contains one or more visible hollows (cavities within the trunk or branches) suitable for occupation by black cockatoo for the purpose of nesting/breeding. Hollows that had an entrance greater than about 12cm in diameter and would allow the entry of a black cockatoo into a suitably orientated and sized branch/trunk, will be recorded as a*

'potential nest hollow'. Identified hollows are 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). The calls of chicks were also listened for if a suitable hollow is present.

Night Roosting Habitat

Direct and indirect evidence of black cockatoos roosting within trees in the survey area was noted if observed. This included searching for branch clippings, droppings and moulted feathers.

3.3 WHEATBELT TEC ASSESSMENT

The vegetation at the survey area was assessed for key diagnostic characteristics to determine whether it comprised the Wheatbelt TEC.

Key characteristics were:

- Vegetation within the Merredin, Katanning or Western Mallee IBRA subregions.
- Woodland structure with tree canopy crown cover of 10-40%.
- Key species of the tree canopy are *Eucalyptus* species as identified in Table 2A of the Conservation Advice[1].
- Key *Eucalyptus* tree species of the canopy have tree or mallet form.
- Presence of native understorey (this can be highly variable between sites) (MRWA 2021).

For roadside reserves, a patch must be a minimum of 5 m wide based on the width of the understorey, not the tree canopy (DCCEEW 2015). Native vegetation along either side of a major road are considered separate patches (DCCEEW 2015).

To be identified as a TEC, the vegetation must also meet the minimum condition thresholds identified in the *Conservation Advice for Eucalypt Woodlands* (DCCEEW 2015; Table C).

[1] http://www.environment.gov.au/biodiversity/threatened/communities/pubs/128-conservation-advice.pdf

TABLE C: MINIMUM THRESHOLDS FOR ROADSIDE PATCHES FOR WHEATBELT TEC

CATEGORY	CONDITION [2]	THRESHOLDS
A	Pristine/Excellent/Very Good	• Understorey[3] comprises 0-30% exotic plant species • Mature trees[4] absent or present
B	Good	• Understorey comprises 30-50% exotic plant species • Mature trees present. At least 5 trees per 0.5 ha
C	Good	• Understorey comprises 30-50% exotic plant species • Mature trees absent or less than 5 trees per 0.5 ha
D	Degraded-good	• Understorey comprises 50-70% exotic plant species • Mature trees present. At least 5 trees per 0.5 ha

[2] Likely to correspond to condition description described in Technical Guidance for Flora and Vegetation Surveys (EPA 2016)
https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/EPA%20Technical%20Guidance%20-%20Flora%20and%20Vegetation%20survey_Dec13.pdf
[3] All species below the tree canopy
[4] Mature trees have a diameter at breast height of ≥30 cm

4 RESULTS AND DISCUSSION

4.1 DESKTOP ASSESSMENT

4.1.1 Atlas of Living Australia

The ALA database identified 118 animal species from within 5 km of the survey area comprising 11 invertebrates, 86 birds, one fish, 16 mammals and four reptiles (Appendix 1). Two species (Australian Ringneck (*Barnardius zonarius*) and Elegant Parrot (*Neophema (Neonanodes) elegans*)) are considered agricultural pests in WA and the feral cat (*Felis catus*) is a non-native species and is a declared pest (DPIRD 2022b). Five identified fauna species are of conservation concern in Western Australia (Table D). Given the small project footprint and the limited disturbance to most vegetation, the mammal species would not be permanently impacted by the project. The Baudin's Cockatoo may be impacted by the removal of habitat trees.

The ALA database identified 126 plant species from within 5 km of the survey area (Appendix 2). Two of these species are non-native (Hop Clover (*Trifolium campestre*) and Rose Clover (*Trifolium hirtum*)). Two species, the Cranbrook Pea (*Gastrolobium lehmannii*) and the Lemon Spider Orchid (*Caladenia luteola*) are listed under state legislation but are unlikely to occur in the survey area (Table D).

4.1.2 Protected Matters Search Tool

The Protected Matters Search Tool (PMST) identified the Wheatbelt TEC as likely to occur in the survey area (Appendix 3). In addition, seven bird, two mammal and two plant species of conservation significance were listed as likely to occur in the survey area.

The Protected Matters Search Tool (PMST) is based on bioclimatic modelling for the potential presence of species. As such, the mapping does not represent actual records of the species in the area but can be useful to determine what conservation significant species may be present. Evaluation of the habitat requirements for each species identified the three species of Black Cockatoo as the only conservation significant species that may occur within the survey area and be impacted by proposed works (Table D).

4.1.3 DBCA Threatened and Priority Fauna Database

The DBCA threatened and priority fauna database revealed 40 conservation significant species within 50 km of the survey area (Appendix 4; Conservation Codes Appendix 5). Nine of these species have been recorded within 5 km of the survey area of which one species may occur in the survey area (Table D). Carnaby's Cockatoo is likely to occur in the survey area and may be impacted by the removal of habitat trees.

It should be noted that the mammal species recorded within 5 km of the survey area are all records from 1899-1909 and most are no longer found in this region. The recorded locations may also not be as precise as current technologies allow.

Analysis of the Black Cockatoo spatial data showed one roosting site within 50 km of the survey area located approximately 35 km northwest along Albany Highway in large area (~150 ha) of remnant vegetation.

Black Cockatoo breeding was recorded at 107 locations within 50 km of the survey area with 18 records occurring within 5 km of the survey area. Seventeen of these occurred within a large patch (~200 ha) of remnant vegetation approximately 2.5 km southeast along Albany Highway. Most of the records occurred within large patches of remnant vegetation across the landscape with occasional records from individual paddock trees. No records were found in roadside reserves along Albany Highway.

4.1.4 DBCA Threatened Ecological Community Database

Based on broadscale vegetation mapping by the DBCA, the survey area is within the region where the Wheatbelt TEC is considered 'likely to occur'.

TABLE D: LIKELIHOOD OF OCCURENCE OF CONSERVATION SIGNIFICANT SPECIES

SOURCE	SPECIES	COMMON NAME	CONSERVATION STATUS	HABITAT PRESENT	LIKELIHOOD OF OCCURENCE	POSSIBLE IMPACTS
BIRDS						
PMST	*Calidris ferruginea*	Curlew Sandpiper	Critically Endangered	N	Unlikely	No impact
PMST	*Calyptorhynchus banksii naso*	Forest Red-tailed Black-Cockatoo, Karrak	Vulnerable	Y	Likely	Removal of habitat trees
PMST	*Falco hypoleucos*	Grey Falcon	Vulnerable	N	Unlikely	No impact
PMST	*Leipoa ocellata*	Malleefowl	Vulnerable	N	Unlikely	No impact
PMST	*Numenius madagascariensis*	Eastern Curlew, Far Eastern Curlew	Critically Endangered	N	Unlikely	No impact
PMST	*Zanda baudinii*	Baudin's Black-Cockatoo, Long-billed Black-cockatoo	Endangered	Y	Likely	Removal of habitat trees
PMST, DBCA	*Zanda latirostris*	Carnaby's Black Cockatoo, Short-billed Black-cockatoo	Endangered	Y	Likely	Removal of habitat trees
MAMMALS						
DBCA	*Bettongia lesueur graii*	Burrowing bettong (inland), Boodie (inland)	Extinct	-	-	-
DBCA	*Bettongia penicillata ogilbyi*	Woylie, Brush-tailed Bettong	Critically Endangered	N	Unlikely	No impact
PMST, ALA, DBCA	*Dasyurus geoffroii*	Chuditch, Western Quoll	Vulnerable	N	Unlikely	No impact
DBCA	*Isoodon fusciventer*	Quenda, Southwestern Brown Bandicoot	Priority 4	N	Unlikely	No impact

SOURCE	SPECIES	COMMON NAME	CONSERVATION STATUS	HABITAT PRESENT	LIKELIHOOD OF OCCURENCE	POSSIBLE IMPACTS
ALA, DBCA	*Macrotis lagotis*	Greater Bilby	Vulnerable	N	Unlikely	No impact
ALA, DBCA	*Myrmecobius fasciatus*	Numbat	Endangered	N	Unlikely	No impact
DBCA	*Notamacropus eugenii derbianus*	Tammar Wallaby	Priority 4	N	Unlikely	No impact
ALA	*Onychogalea lunata*	Crescent Nailtail Wallaby	Extinct	-	-	-
PMST	*Phascogale calura*	Red-tailed Phascogale, Red-tailed Wambenger, Kenngoor	Vulnerable	Y	Unlikely	No impact
DBCA	*Pseudocheirus occidentalis*	Western Ringtail Possum, Ngwayir	Critically Endangered	N	Unlikely	No impact
PLANTS						
PMST	*Adenanthos pungens* subsp. *pungens*	Spiky Adenanthos	Vulnerable	N	Unlikely	No impact
ALA	*Caladenia luteola*	Lemon Spider Orchid	Critically Endangered	N	Unlikely	No impact
ALA	*Gastrolobium lehmannii*	Cranbrook Pea	Vulnerable	N	Unlikely	No impact
PMST	*Roycea pycnophylloides*	Saltmat	Endangered	N	Unlikely	No impact

4.2 BLACK COCKATOO HABITAT ASSESSMENT

The predominant tree species in the survey area comprised Yates (*Eucalyptus occidentalis)* with some Swamp Sheoak (*Casuarina obesa*). Two Yate trees were present on the eastern side and two Yate trees on the western side of Albany Highway (Figure 7) but did not have a DBH >50 cm therefore do not meet the criteria as potential habitat trees. One Yate tree ~10 m outside the survey area had a DBH >50 cm but did not contain hollows of a suitable size for Black Cockatoo breeding. There was no evidence of black cockatoos roosting in the survey area.

The survey area represents foraging habitat of relatively low value due to lack of proteaceous species.

Although the trees in the survey area comprise species utilised by Black Cockatoos, they did not meet the criteria of potential habitat trees. Removal of the trees will not significantly affect Black Cockatoo habitat.

4.3 WHEATBELT TEC ASSESSMENT

Albany Highway dissects the survey area and therefore the vegetation on either side of the road are assessed as separate patches.

The vegetation on the eastern side of the highway (Patch 1) comprised two *Eucalyptus occidentalis* (Yate) with an understorey of *Melaleuca* sp. in the roadside drain. This vegetation was in Very Good condition and meets the criteria of the Wheatbelt TEC Category A (Figure 7; Appendix 6).

On the southern side of Warrenup Road (Patch 20, the vegetation is predominantly *Acacia saligna* which is not part of the Wheatbelt TEC (Figure 7; Appendix 6).

On the western side of the highway (Patch 3), the tree canopy comprised *Eucalyptus wandoo* and *E. occidentalis* (Figure 7; Appendix 6). The understorey contained *Jacksonia sternbergiana*, and *Acacia* species not native to the Wheatbelt TEC. There were also a high proportion of grassy weeds compared to native vegetation in the understory. Although the tree canopy and *Jacksonia* are part of the TEC, the understorey comprised >70% exotic species and therefore the survey area alone does not qualify as Wheatbelt TEC. The vegetation of the survey area was particularly degraded, likely due to intersections with Warburton Road and Dujemerrup Road in addition to the surrounding agricultural land use. However, <50 m northwest along Albany Highway, the vegetation is less degraded and contains a higher proportion of native species in the understorey and fits the criteria for the Wheatbelt TEC in good condition (Category B; see Table C above). The survey area is therefore part of the 'buffer zone' of the TEC and still requires consideration to protect the quality of the TEC.

As the survey area is within the Wheatbelt TEC and buffer area a native vegetation clearing permit will be required for this project. DWER will assess the application against the 'Ten Clearing Principles' to determine whether the clearing is likely to be at variance to the Principles. The Ten Clearing Principles aim to ensure that potential impacts resulting from removal of native vegetation can be assessed in an integrated way. An assessment of the project in response to the clearing principles is provided to aid with the application for a native vegetation clearing permit (Table E).

TABLE E: ASSESSMENT AGAINST CLEARING PRINCIPLES

CLEARING PRINCIPLE	ASSESSMENT RESPONSE
a) – Native vegetation should not be cleared if it comprises a high level of biological diversity	The trees to be cleared are Yates (*Eucalyptus occidentalis*). These species are widespread and are not protected. The proposal is not considered to be at variance with this clearing principle.
b) – Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to WA	The trees to be removed are DBH <50 cm and therefore are not large enough to be considered habitat trees for Black Cockatoos. The remaining vegetation is low quality foraging habitat for Black Cockatoos. The vegetation does not provide significant habitat for native fauna. The proposal is not considered to be at variance with this clearing principle.
c) – Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	No threatened flora was detected in the survey area. Clearing is not considered to be at variance with this clearing principle.
d) – Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community	The vegetation on the eastern side of Albany Highway comprises Wheatbelt TEC. The vegetation on the western side of Albany Highway is within the buffer area for Wheatbelt TEC. Vegetation over 2.2 m in height requires removal for the turning circle of the wind turbine blades and large trees need to be removed. Clearing is at variance with this clearing principle.
e) – Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	Although the vegetation to be disturbed is part of the Wheatbelt TEC and buffer area, the area to be disturbed is very small and with the exception of the removal of a few trees, would not cause permanent change to the area. The habitat continues in the road reserves beyond the impact area. Clearing may be at variance with this clearing principle.
f) – Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	There are no wetlands or watercourses associated with the survey area although there is a roadside drain. The drain will not be impacted by the proposal and *Melaleuca* trees will just be trimmed. Clearing is not at variance with this clearing principle.
g) – Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	Most vegetation is to be trimmed. Tree stumps will not be removed. There is no ground disturbance expected to cause erosion. Clearing is not considered to be at variance with this clearing principle.
h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the	There are no nearby conservation areas. The clearing is not considered to be at variance with this clearing principle.

CLEARING PRINCIPLE	ASSESSMENT RESPONSE
environmental values of any adjacent or nearby conservation area.	
i) – Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	Vegetation clearing is minimal and will no cause changes to the groundwater. The clearing is not considered to be at variance with this clearing principle.
j) – Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.	Vegetation clearing is minimal and would not cause changes to flooding regimes. The clearing is not at variance with this clearing principle.

Legend

- Yate Location
- Vegetation Patches
- Not TEC
- TEC Buffer
- Wheatbelt TEC
- Vegetation and Trees to be removed
- Cadastral Boundary

N

0 10 20m

Scale: 1:1,000
MGA94 (Zone 50)

CAD Ref: a2939F001

Date: December 2022 | Rev: A | A4

Aurora environmental
ASSESS • ADVISE • APPLY

Author: C. Hall | AU Ref: REX2022-001

Drawn: CAD Resources ~ www.cadresources com au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Albany Highway onto Warrenup Road

Vegetation Mapping

Figure: **7**

5 CONCLUSIONS AND RECOMMENDATIONS

Black Cockatoos

- The trees within the survey area were not of sufficient size to meet the criteria of potential habitat trees.
- The vegetation is of low foraging quality for Black Cockatoos.
- Black Cockatoo habitat will not be significantly impacted by the project.

Wheatbelt TEC

- The patch on the western side of Albany Highway does not comprise Wheatbelt TEC but is within 50 m of vegetation that does meet the criteria for Wheatbelt TEC (along the western side of the highway) and therefore is considered part of the buffer area of the TEC.
- The patch on the eastern side of Albany Highway but to the south of Warrenup Road does not comprise Wheatbelt TEC.
- The patch on the eastern side of Albany Highway **does** meet the criteria of the Wheatbelt TEC in very good condition.

Recommendations

- Given that the vegetation either comprises Wheatbelt TEC or buffer vegetation for Wheatbelt TEC, Main Roads have advised that a clearing permit will be required for the removal of the trees. If possible, the trees should be retained to remove the need for a native vegetation clearing application with DWER.
- If tree removal is required, the stumps should remain to a height of at least 1 m to allow them to regrow and just be pruned as required.
- Impact to most of the vegetation will be minimised by allowing it to regrow after pruning and just continuing to trim as required in the future.
- The eastern side of Albany Highway should be cleared/trimmed prior to the western side to reduce weed transmittal.
- Cleared and trimmed vegetation should be mulched and re-spread through the area on the side of the highway from which it was cleared. This will encourage revegetation, reduce erosion and suppress weeds. Although the vegetation on the western side of the highway comprises many species not part of the Wheatbelt TEC, the tall vegetation is still native to the area and can be safely used as mulching material.
- All personnel, vehicles, equipment and tools should be clean and free from mud, vegetation and soil to reduce weeds to prevent pathogen spread.

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APPENDIX 1

Atlas of Living Australia Fauna Search

APPENDIX 1: ATLAS OF LIVING AUSTRALIA FAUNA SEARCH

CLASS	SPECIES	COMMON NAME	CONSERVATION SATUS WA	INVASIVE
Invertebrate (Arachnid)	*Eucanippe nemestrina*	Trapdoor Spider		
Invertebrate (Arachnid)	*Teyl damsonoides*	Trapdoor Spider		
Invertebrate (Insect)	*Amitermes procerus*	Termite		
Invertebrate (Insect)	*Nasutitermes exitiosus*	Termite		
Invertebrate (Insect)	*Oxycarenus (Oxycarenus) arctatus*	Coon Bug		
Invertebrate (Insect)	*Sericophorus relucens*	Wasp		
Invertebrate (Insect)	*Tumulitermes subaquilus*	Termite		
Invertebrate (Insect)	*Tumulitermes westraliensis*	Termite		
Invertebrate (Insect)	*Xylochomitermes occidualis*	Termite		
Invertebrate (Crustacean)	*Cherax preissii*	Koonac		
Invertebrate (Crustacean)	*Porcellio scaber*	Slater		
Bird	*Acanthiza (Acanthiza) apicalis*	Red-rumped Tit		
Bird	*Acanthiza (Geobasileus) chrysorrhoa*	Yellow-tail		
Bird	*Acanthiza (Geobasileus) inornata*	Masters' Tit		
Bird	*Accipiter (Leucospiza) fasciatus*	Grey-headed Goshawk		
Bird	*Aegotheles (Aegotheles) cristatus*	Australian Owlet-nightjar		
Bird	*Anas (Anas) superciliosa*	Pacific Black Duck		
Bird	*Anthochaera (Anthochaera) carunculata*	Red Wattlebird		
Bird	*Anthus (Anthus) novaeseelandiae*	Australian Pipit		
Bird	*Aquila (Uroaetus) audax*	Wedge-tailed Eagle		
Bird	*Artamus (Angroyan) cinereus*	Black-faced Woodswallow		
Bird	*Artamus (Angroyan) cyanopterus*	Dusky Woodswallow		
Bird	*Barnardius zonarius*	Australian Ringneck		Pest animals list

APPENDIX 1: ATLAS OF LIVING AUSTRALIA FAUNA SEARCH

CLASS	SPECIES	COMMON NAME	CONSERVATION SATUS WA	INVASIVE
Bird	*Cacatua (Cacatua) galerita*	Sulphur-crested Cockatoo		
Bird	*Cacomantis (Vidgenia) flabelliformis*	Fan-tailed Cuckoo		
Bird	*Chalcites lucidus*	Shining Bronze-cuckoo		
Bird	*Chenonetta jubata*	Australian Wood Duckmaned Goose		
Bird	*Chrysococcyx lucidus*	Shining Cuckoo		
Bird	*Cincloramphus (Maclennania) mathewsi*	Rufous Songlark		
Bird	*Circus assimilis*	Spotted Harrier		
Bird	*Climacteris (Climacteris) rufus*	Rufous Treecreeper		
Bird	*Colluricincla (Colluricincla) harmonica*	Grey Shrike-thrush		
Bird	*Coracina (Coracina) novaehollandiae*	Black-faced Cuckoo-shrike		
Bird	*Corvus coronoides*	Australian Raven		
Bird	*Cracticus torquatus*	Grey Butcherbird		
Bird	*Dacelo (Dacelo) novaeguineae*	Kookaburra		
Bird	*Daphoenositta (Neositta) chrysoptera*	Varied Sittella		
Bird	*Dicaeum (Dicaeum) hirundinaceum*	Mistletoebird		
Bird	*Dromaius novaehollandiae*	Emu		
Bird	*Egretta novaehollandiae*	Matuka		
Bird	*Elanus axillaris*	Black-shouldered Kite		
Bird	*Elseyornis melanops*	Black-fronted Dotterel		
Bird	*Eolophus roseicapilla*	Galah		
Bird	*Eopsaltria (Eopsaltria) griseogularis*	Western Yellow Robin		
Bird	*Falco (Hierofalco) peregrinus*	Duck Hawk		
Bird	*Falco (Ieracidea) berigora*	Chicken Hawk		

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CLASS	SPECIES	COMMON NAME	CONSERVATION SATUS WA	INVASIVE
Bird	*Falco (Tinnunculus) cenchroides*	Wala		
Bird	*Falcunculus frontatus*	Crested Shrike-tit		
Bird	*Fulica atra*	Eurasian Coot		
Bird	*Gavicalis virescens*	Singing Honeyeater		
Bird	*Gerygone fusca*	Fuscous Warbler		
Bird	*Gliciphila melanops*	Tawny-crowned Honeyeater		
Bird	*Grallina cyanoleuca*	Magpie-lark		
Bird	*Gymnorhina tibicen*	Australian Magpie		
Bird	*Hirundo (Hirundo) neoxena*	Welcome Swallow		
Bird	*Hylacola cauta*	Shy Heathwren		
Bird	*Lichmera (Lichmera) indistincta*	Brown Honeyeater		
Bird	*Malurus (Leggeornis) pulcherrimus*	Blue-breasted Fairy-wren		
Bird	*Malurus (Malurus) splendens*	Splendid Fairy-wren		
Bird	*Melanodryas (Melanodryas) cucullata*	Hooded Robin		
Bird	*Melithreptus (Eidopsarus) brevirostris*	Brown-headed Honeyeater		
Bird	*Microeca (Microeca) fascinans*	Jacky Winter		
Bird	*Myiagra (Seisura) inquieta*	Restless Flycatcher		
Bird	*Neophema (Neonanodes) elegans*	Elegant Parrot		Pest animals list
Bird	*Ninox (Hieracoglaux) connivens*	Barking Owl		
Bird	*Ninox (Ninox) novaeseelandiae*	Southern Boobook		
Bird	*Ocyphaps lophotes*	Crested Pigeon		
Bird	*Pachycephala (Alisterornis) rufiventris*	Rufous Whistler		
Bird	*Pachycephala (Pachycephala) pectoralis*	Golden Whistler		

APPENDIX 1: ATLAS OF LIVING AUSTRALIA FAUNA SEARCH

CLASS	SPECIES	COMMON NAME	CONSERVATION SATUS WA	INVASIVE
Bird	*Pardalotus (Pardalotinus) striatus*	Striated Pardalote		
Bird	*Pardalotus (Pardalotus) punctatus*	Spotted Pardalote		
Bird	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet		
Bird	*Petrochelidon (Hylochelidon) nigricans*	Tree Martin		
Bird	*Petroica (Petroica) boodang*	Scarlet Robin		
Bird	*Petroica (Petroica) goodenovii*	Red-capped Robin		
Bird	*Phalacrocorax (Phalacrocorax) sulcirostris*	Little Black Cormorant		
Bird	*Phaps (Phaps) chalcoptera*	Common Bronzewing		
Bird	*Phaps (Phaps) elegans*	Brush Bronzewing		
Bird	*Phylidonyris (Meliornis) niger*	White-cheeked Honeyeater		
Bird	*Phylidonyris (Meliornis) novaehollandiae*	New Holland Honeyeater		
Bird	*Platycercus (Violania) icterotis*	Western Rosella		
Bird	*Poliocephalus poliocephalus*	Hoary-headed Dabchick		
Bird	*Polytelis anthopeplus*	Regent Parrot		
Bird	*Pomatostomus (Morganornis) superciliosus*	White-browed Babbler		
Bird	*Psophodes (Phodopses) nigrogularis*	Western Whipbird		
Bird	*Ptilotula ornata*	Yellow-plumed Honeyeater		
Bird	*Purpureicephalus spurius*	Red-capped Parrot		
Bird	*Rhipidura (Rhipidura) albiscapa*	Grey Fantail		
Bird	*Rhipidura (Sauloprocta) leucophrys*	Willie Wagtail		
Bird	*Sericornis (Sericornis) frontalis*	White-fronted Scrubwren		
Bird	*Smicrornis brevirostris*	Brown Weebill		
Bird	*Strepera (Neostrepera) versicolor*	Grey Currawong		

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CLASS	SPECIES	COMMON NAME	CONSERVATION SATUS WA	INVASIVE
Bird	*Tadorna (Casarca) tadornoides*	Chestnut Sheldrake		
Bird	*Todiramphus (Todiramphus) sanctus*	Sacred Kingfisher		
Bird	*Tyto alba*	Barn Owl		
Bird	*Zanda baudinii*	Baudin's Black-cockatoo	Endangered	
Bird	*Zosterops lateralis*	Silvereye		
Fish	*Galaxias occidentalis*	Western Galaxias		
Mammal	*Antechinus flavipes*	Yellow-footed Antechinus		
Mammal	*Bettongia lesueur*	Burrowing Bettong		
Mammal	*Bettongia penicillata*	Brush-tailed Bettong		
Mammal	*Dasyurus geoffroii*	Western Quoll	Vulnerable	
Mammal	*Felis catus*	Cat		Non-native species
Mammal	*Isoodon fusciventer*	Quenda		
Mammal	*Macropus fuliginosus*	Western Grey Kangaroo		
Mammal	*Macrotis lagotis*	Greater Bilby	Vulnerable	
Mammal	*Myrmecobius fasciatus*	Numbat	Endangered	
Mammal	*Notamacropus eugenii*	Tammar Wallaby		
Mammal	*Notamacropus irma*	Western Brush Wallaby		
Mammal	*Onychogalea lunata*	Crescent Nailtail Wallaby	Extinct	
Mammal	*Pseudocheirus occidentalis*	Ngwayir		
Mammal	*Sminthopsis fuliginosus*	Dusky Dunnart		
Mammal	*Sminthopsis gilberti*	Gilbert's Dunnart		
Mammal	*Trichosurus vulpecula*	Common Brushtail Possum		
Reptile	*Anilios australis*	Southern Blind Snake		

APPENDIX 1: ATLAS OF LIVING AUSTRALIA FAUNA SEARCH

CLASS	SPECIES	COMMON NAME	CONSERVATION SATUS WA	INVASIVE
Reptile	*Chelodina (Macrochelodina) oblonga*	Northern Snake-necked Turtle		
Reptile	*Menetia greyii*	Common Dwarf Skink		
Reptile	*Tiliqua rugosa*	Boggi		

APPENDIX 2

Atlas of Living Australia Flora Search

APPENDIX 2: ATLAS OF LIVING AUSTRALIA FLORA SEARCH

FAMILY	SPECIES	COMMON NAME	CONSERVATION SATUS WA	INVASIVE
Asparagaceae	*Chamaescilla spiralis*			
Asparagaceae	*Laxmannia minor*			
Asparagaceae	*Laxmannia sessiliflora*	Nodding Lily		
Asparagaceae	*Lomandra odora*	Fragrant Mat Rush		
Asparagaceae	*Lomandra suaveolens*			
Asparagaceae	*Sowerbaea laxiflora*	Vanilla Lily		
Asteraceae	*Cotula coronopifolia*	Water-buttons		
Asteraceae	*Gnephosis drummondii*	Slender Cup-flower		
Asteraceae	*Helichrysum leucopsideum*	Satin Everlasting		
Asteraceae	*Hyalosperma demissum*	Moss Sunray		
Asteraceae	*Millotia tenuifolia*	Soft Millotia		
Asteraceae	*Podolepis gracilis*	Slender Podolepis		
Asteraceae	*Podolepis lessonii*			
Asteraceae	*Siloxerus multiflorus*	Small Wrinklewort		
Casuarinaceae	*Allocasuarina lehmanniana*	Dune Sheoak		
Casuarinaceae	*Allocasuarina thuyoides*	Horned Sheoak		
Cephaloziellaceae	*Cephaloziella exiliflora*			
Colchicaceae	*Burchardia congesta*			
Colchicaceae	*Burchardia monantha*			
Droseraceae	*Drosera bulbosa*	Red-leaved Sundew		
Droseraceae	*Drosera menziesii*	Pink Rainbow		

APPENDIX 2: ATLAS OF LIVING AUSTRALIA FLORA SEARCH

FAMILY	SPECIES	COMMON NAME	CONSERVATION SATUS WA	INVASIVE
Elaeocarpaceae	*Tetratheca virgata*			
Ericaceae	*Astroloma compactum*			
Ericaceae	*Leucopogon hirsutus*	Hairy Beard-heath		
Ericaceae	*Styphelia sp. Narrogin (R.D.Royce 8158)*			
Fabaceae	*Acacia acuminata*	Raspberry Jam		
Fabaceae	*Acacia lasiocarpa*			
Fabaceae	*Acacia pycnantha*	Black Wattle		
Fabaceae	*Acacia stenoptera*			
Fabaceae	*Bossiaea spinosa*			
Fabaceae	*Daviesia crenulata*			
Fabaceae	*Gastrolobium dorrienii*			
Fabaceae	*Gastrolobium lehmannii*	Cranbrook Pea	Vulnerable	
Fabaceae	*Gastrolobium praemorsum*			
Fabaceae	*Isotropis cuneifolia*	Granny Bonnets		
Fabaceae	*Jacksonia sternbergiana*	Stinkwood		
Fabaceae	*Trifolium campestre*	Hop Clover		Non-native species
Fabaceae	*Trifolium hirtum*	Rose Clover		Non-native species
Fabaceae	*Vicia benghalensis*	Purple Vetch		
Fossombroniaceae	*Fossombronia pusilla*			
Goodeniaceae	*Coopernookia polygalacea*			
Goodeniaceae	*Dampiera linearis*	Wedge-leaved Dampiera		

APPENDIX 2: ATLAS OF LIVING AUSTRALIA FLORA SEARCH

FAMILY	SPECIES	COMMON NAME	CONSERVATION SATUS WA	INVASIVE
Goodeniaceae	*Goodenia trinervis*			
Haemodoraceae	*Conostylis aculeata*	Prickly Conostylis		
Haemodoraceae	*Conostylis petrophiloides*			
Haemodoraceae	*Tribonanthes longipetala*	Branching Tiurndin		
Haloragaceae	*Glischrocaryon roei*			
Iridaceae	*Gladiolus carneus*	Broad-leaved Painted Lady		
Malvaceae	*Thomasia foliosa*			
Myrtaceae	*Babingtonia camphorosmae*			
Myrtaceae	*Eucalyptus decipiens*	Redheart		
Myrtaceae	*Eucalyptus occidentalis*	Flat Topped Yate		
Myrtaceae	*Eucalyptus pachyloma*	Kalgan Plains Mallee		
Myrtaceae	*Eucalyptus phaenophylla*	Common Southern Mallee		
Myrtaceae	*Eucalyptus wandoo*	White Gum		
Myrtaceae	*Eucalyptus xanthonema*	Yellow Flowered Mallee		
Myrtaceae	*Hypocalymma angustifolium*	White Myrtle		
Myrtaceae	*Kunzea preissiana*			
Myrtaceae	*Kunzea recurva*			
Myrtaceae	*Melaleuca rhaphiophylla*	Swamp Paperbark		
Myrtaceae	*Melaleuca viminea*	Mohan		
Myrtaceae	*Verticordia densiflora*	Compacted Featherflower		
Orchidaceae	*Caladenia denticulata*	Wispy Spider Orchid		

APPENDIX 2: ATLAS OF LIVING AUSTRALIA FLORA SEARCH

FAMILY	SPECIES	COMMON NAME	CONSERVATION SATUS WA	INVASIVE
Orchidaceae	*Caladenia filifera*	Clumping Spider Orchid		
Orchidaceae	*Caladenia flava*	Cowslip Orchid		
Orchidaceae	*Caladenia footeana*	Crimson Spider Orchid		
Orchidaceae	*Caladenia hirta*	Sugar Candy Orchid		
Orchidaceae	*Caladenia longicauda*	White Spider Orchid		
Orchidaceae	*Caladenia luteola*	Lemon Spider Orchid	Critically Endangered	
Orchidaceae	*Caladenia macrostylis*	Leaping Spider Orchid		
Orchidaceae	*Caladenia nana*	Pink Fan Orchid		
Orchidaceae	*Caladenia pendens*	Pendant Spider Orchid		
Orchidaceae	*Caladenia polychroma*	Joseph's Spider Orchid		
Orchidaceae	*Caladenia x ericksoniae*	Prisoner Orchid		
Orchidaceae	*Caladenia x suffusa*	Tinged Spider Orchid		
Orchidaceae	*Caladenia xantha*	Primrose Spider Orchid		
Orchidaceae	*Disa bracteata*	South African Orchid		
Orchidaceae	*Diuris corymbosa*	Common Donkey Orchid		
Orchidaceae	*Diuris decrementa*			
Orchidaceae	*Diuris filifolia*	Cat's-face Orchid		
Orchidaceae	*Diuris laxiflora*	Bee Orchid		
Orchidaceae	*Diuris longifolia*	Common Donkey Orchid		
Orchidaceae	*Diuris porrifolia*	Rosy-cheeked Donkey Orchid		
Orchidaceae	*Elythranthera emarginata*	Pink Enamel Orchid		

APPENDIX 2: ATLAS OF LIVING AUSTRALIA FLORA SEARCH

FAMILY	SPECIES	COMMON NAME	CONSERVATION SATUS WA	INVASIVE
Orchidaceae	*Eriochilus dilatatus*	White Bunny Orchid		
Orchidaceae	*Microtis alba*	White Mignonette Orchid		
Orchidaceae	*Pterostylis hamiltonii*	Red-veined Shell Orchid		
Orchidaceae	*Pterostylis leptochila*	Ravensthorpe Rufous Greenhood		
Orchidaceae	*Pterostylis picta*	Painted Rufous Greenhood		
Orchidaceae	*Pterostylis pusilla*	Ruddyhood		
Orchidaceae	*Pterostylis recurva*	Jug Orchid		
Orchidaceae	*Thelymitra antennifera*	Lemon-scented Sun Orchid		
Orchidaceae	*Thelymitra benthamiana*	Blotched Sun-orchid		
Orchidaceae	*Thelymitra crinita*	Blue Lady Orchid		
Orchidaceae	*Thelymitra macrophylla*	Scented Sun Orchid		
Pittosporaceae	*Billardiera lehmanniana*			
Poaceae	*Anthosachne scabra*			
Poaceae	*Austrostipa mollis*	Soft Spear-grass		
Poaceae	*Poa porphyroclados*			
Poaceae	*Setaria sphacelata*	South African Pigeon Grass		
Polygalaceae	*Comesperma volubile*	Love Creeper		
Proteaceae	*Banksia acuminata*			
Proteaceae	*Banksia attenuata*	Coast Banksia		
Proteaceae	*Banksia fraseri*			
Proteaceae	*Banksia grandis*	Giant Banksia		

APPENDIX 2: ATLAS OF LIVING AUSTRALIA FLORA SEARCH

FAMILY	SPECIES	COMMON NAME	CONSERVATION SATUS WA	INVASIVE
Proteaceae	*Banksia littoralis*	Swamp Banksia		
Proteaceae	*Banksia mucronulata*			
Proteaceae	*Grevillea cirsiifolia*	Varied-leaf Grevillea		
Proteaceae	*Hakea marginata*			
Proteaceae	*Synaphea obtusata*			
Restionaceae	*Desmocladus asper*			
Restionaceae	*Desmocladus lateriflorus*			
Rhamnaceae	*Cryptandra myriantha*	Western Cryptandra		
Rhamnaceae	*Cryptandra nutans*			
Rhamnaceae	*Polianthion wichurae*			
Rubiaceae	*Opercularia vaginata*	Dog Weed		
Rutaceae	*Boronia defoliata*			
Rutaceae	*Diplolaena microcephala*	Lesser Diplolaena		
Santalaceae	*Choretrum glomeratum*	Common Sourbush		
Sapindaceae	*Dodonaea humifusa*			
Stylidiaceae	*Stylidium affine*	Queen Triggerplant		
Stylidiaceae	*Stylidium androsaceum*			
Stylidiaceae	*Stylidium petiolare*	Horn Triggerplant		
Stylidiaceae	*Stylidium piliferum*	Common Butterfly Triggerplant		
Stylidiaceae	*Stylidium uniflorum*	Pincushion Triggerplant		
Thymelaeaceae	*Pimelea angustifolia*	Narrow-leaved Pimelea		

APPENDIX 3

EPBC Act Protected Matters Report

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: 11-Nov-2022

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:	2
Listed Threatened Species:	13
Listed Migratory Species:	8

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:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	12
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:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	4
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 Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, 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.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Eucalypt Woodlands of the Western Australian Wheatbelt	Critically Endangered	Community likely to occur within area	In feature area
Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia	Endangered	Community may occur within area	In buffer area only

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	Buffer Status
BIRD			
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Zanda baudinii listed as Calyptorhynchus baudinii			
Baudin's Black-Cockatoo, Long-billed Black-cockatoo [87736]	Endangered	Species or species habitat likely to occur within area	In feature area
Zanda latirostris listed as Calyptorhynchus latirostris			
Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Species or species habitat known to occur within area	In feature area
MAMMAL			
Dasyurus geoffroii			
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Phascogale calura			
Red-tailed Phascogale, Red-tailed Wambenger, Kenngoor [316]	Vulnerable	Species or species habitat likely to occur within area	In feature area
PLANT			
Adenanthos pungens subsp. effusus			
Sprawling Spiky Adenanthos [10742]	Endangered	Species or species habitat may occur within area	In buffer area only
Adenanthos pungens subsp. pungens			
Spiky Adenanthos [19429]	Vulnerable	Species or species habitat may occur within area	In feature area
Gastrolobium lehmannii			
Cranbrook Pea [22282]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Roycea pycnophylloides			
Saltmat [21161]	Endangered	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla cinerea			
Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Unknown		
Commonwealth Land - [51001]	WA	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
[Bubulcus ibis as Ardea ibis](#) Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
[Chalcites osculans as Chrysococcyx osculans](#) Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
[Motacilla cinerea](#) Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area	In buffer area only

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Tunney Passing Lanes, 30km S of Kojonup, WA	2014/7309	Controlled Action	Post-Approval	In feature area
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

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.

Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601 Australia
+61 2 6274 1111

APPENDIX 4

DBCA Threatened and Priority Fauna

APPENDIX 4: DBCA THREATENED AND PRIORITY FAUNA

SPECIES	COMMON NAME	WA STATUS	EPBC STATUS
BIRDS			
Actitis hypoleucos	Common Sandpiper	MI	MI
Botaurus poiciloptilus	Australasian Bittern	EN	EN
Cacatua pastinator pastinator	Muir's corella	CD	
Calidris acuminata	Sharp-tailed sandpiper	MI	MI
Calidris canutus	Red knot	EN	EN
Calidris ferruginea	curlew sandpiper	CR	MI
Calidris ruficollis	Red-necked stint	MI	MI
Calyptorhynchus banksii naso	forest red-tailed black cockatoo	VU	VU
Calyptorhynchus baudinii	Baudin's cockatoo	EN	EN
Calyptorhynchus latirostris	Carnaby's cockatoo	EN	EN
Charadrius leschenaultii	Greater sand plover, large sand plover	VU	MI
Falco peregrinus	peregrine falcon	OS	
Hydroprogne caspia	Caspian Tern	MI	MI
Leipoa ocellata	malleefowl	VU	VU
Limosa lapponica	Bar-tailed godwit	MI	MI
Limosa limosa	Black-tailed godwit	MI	MI
Numenius madagascariensis	Eastern curlew	CR	CR
Numenius phaeopus	Whimbrel	MI	MI
Oxyura australis	Blue-billed duck	P4	
Pandion haliaetus	Osprey	MI	MI
Platycercus icterotis xanthogenys	western rosella (inland)	P4	
Pluvialis squatarola	Grey plover	MI	MI
Psophodes nigrogularis	western whipbird	EN or P4	
Psophodes nigrogularis oberon	western whipbird (western mallee)	P4	
Thalasseus bergii	Crested tern	MI	MI
Thinornis rubricollis	Hooded plover, hooded dotterel	P4	
Tringa nebularia	Common greenshank	MI	MI
Tyto novaehollandiae novaehollandiae	Masked Owl (southwest)	P3	
INVERTEBRATES			
Bothriembryon bradshawi	Bradshaw's bothriembryontid land snail (Tambellup)	P3	
MAMMALS			
Bettongia lesueur graii	Burrowing bettong (inland), boodie (inland)	EX	EX

APPENDIX 4: DBCA THREATENED AND PRIORITY FAUNA

SPECIES	COMMON NAME	WA STATUS	EPBC STATUS
Bettongia penicillata ogilbyi	Woylie, brush-tailed bettong	CR	EN
Dasyurus geoffroii	chuditch, western quoll	VU	VU
Hydromys chrysogaster	water-rat, rakali	P4	
Isoodon fusciventer	Quenda, southwestern brown bandicoot	P4	
Macrotis lagotis	bilby, dalgyte, ninu	VU	VU
Myrmecobius fasciatus	numbat, walpurti	EN	EN
Notamacropus eugenii derbianus	Tammar wallaby	P4	
Notamacropus irma	western brush wallaby	P4	
Onychogalea lunata	crescent nailtail wallaby, tjawalpa	EX	EX
Perameles bougainville	Shark Bay bandicoot, western barred bandicoot, little marl	VU	EN
Phascogale calura	red-tailed phascogale, kenngoor	CD	VU
Phascogale tapoatafa wambenger	south-western brush-tailed phascogale, wambenger	CD	
Pseudocheirus occidentalis	Western ringtail possum, ngwayir	CR	CR
Pseudomys occidentalis	Western mouse	P4	

APPENDIX 5

Conservation Code Definitions

CONSERVATION CODES

For Western Australian Fauna and Flora

Threatened, Extinct and Specially Protected fauna or flora[1] are species[2] which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such.

The *Wildlife Conservation (Specially Protected Fauna) Notice 2018* and the *Wildlife Conservation (Rare Flora) Notice 2018* have been transitioned under regulations 170, 171 and 172 of the *Biodiversity Conservation Regulations 2018* to be the lists of Threatened, Extinct and Specially Protected species[3] under Part 2 of the *Biodiversity Conservation Act 2016.*

Categories of Threatened, Extinct and Specially Protected fauna and flora are:

T Threatened species

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

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

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

The assessment of the conservation status of threatened species is in accordance with the BC Act listing criteria and the requirements of Ministerial Guideline (Number 1) and Ministerial Guideline (Number 2) that adopts the use of the International Union for Conservation of Nature (IUCN) Red List of Threatened Species Categories and Criteria[4], and is based on the national distribution of the species.

CR Critically endangered species

Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines.

Examples of use:

- The western ringtail possum (*Pseudocheirus occidentalis*) is listed as a critically endangered threatened species under the *Biodiversity Conservation Act 2016.*
- Western ringtail possum is listed as critically endangered under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table: column heading: BC Act, row text: CR.

EN Endangered species

Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines.

Examples of use:

- *Caladenia hopperiana* is listed as an endangered threatened species under the *Biodiversity Conservation Act 2016.*
- *Caladenia hopperiana* is listed as endangered under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table: column heading: BC Act, row text: EN.

VU Vulnerable species

Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines.

Examples of use:

- The forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*) is listed as a vulnerable threatened species under the *Biodiversity Conservation Act 2016.*
- Forest red-tailed black cockatoo is listed as vulnerable under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table: column heading: BC Act, row text: VU.

Extinct species

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

EX Extinct species

Species where "*there is no reasonable doubt that the last member of the species has died*", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Examples of use:

- *Acacia kingiana* is listed as an extinct species under the *Biodiversity Conservation Act 2016.*
- *Acacia kingiana* is listed as extinct under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table: column heading: BC Act, row text: EX.

EW Extinct in the wild species

Species that *"is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no fauna or flora species listed as extinct in the wild.

SP Specially protected species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered, or vulnerable) or extinct species under the BC Act cannot also be listed as specially protected species.

MI Migratory species

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Migratory species include birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA)[5], China (CAMBA)[6] or The Republic of Korea (ROKAMBA)[7], and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention)[8], an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Examples of use:

- The wedge-tailed shearwater (*Ardenna pacifica*) is listed as a specially protected migratory species under the *Biodiversity Conservation Act 2016.*
- Wedge-tailed shearwater is listed as migratory under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table: column heading: BC Act, row text: MI.

CD **Species of special conservation interest (conservation dependent)**

Species of special conservation need that are dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

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

Examples of use:

- The wambenger, south-western brush-tailed phascogale (*Phascogale tapoatafa wambenger*) is listed as a specially protected species of special conservation interest under the *Biodiversity Conservation Act 2016.*
- Wambenger, south-western brush-tailed phascogale, is listed as conservation dependent under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table: column heading: BC Act, row text: CD.

OS **Species otherwise in need of special protection (other specially protected)**

Species otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

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

Examples of use:

- The dugong (*Dugong dugon*) is listed as a specially protected species otherwise in need of special protection under the *Biodiversity Conservation Act 2016.*
- Dugon is listed as other specially protected fauna under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table: column heading: BC Act, row text: OS.

P **Priority species**

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.

1 **Priority 1: Poorly-known species - known from few locations, none on conservation lands**

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, for example, agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation.

Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements for threatened listing and appear to be under immediate threat from known threatening processes. These species are in urgent need of further survey.

Examples of use:

- *Borya stenophylla* is listed as a Priority 1 species by the Department of Biodiversity, Conservation and Attractions.
- *Borya stenophylla* is listed as Priority 1 on the DBCA Priority Flora List.
- Listing reference in a table: column heading: DBCA, row text: P1.

2 Priority 2: Poorly-known species - known from few locations, some on conservation lands

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, for example, national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation.

Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements for threatened listing and appear to be under threat from known threatening processes. These species are in urgent need of further survey.

Examples of use:

- *Caladenia nivalis* is listed as a Priority 2 species by the Department of Biodiversity, Conservation and Attractions.
- *Caladenia nivalis* is listed as Priority 2 on the DBCA Priority Flora List.
- Listing reference in a table: column heading: DBCA, row text: P2.

3 Priority 3: Poorly-known species - known from several locations

Species that are known from several locations and the species does not appear to be under imminent threat or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat.

Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. These species need further survey.

Examples of use:

- *Acacia nitidula* is listed as a Priority 3 species by the Department of Biodiversity, Conservation and Attractions.
- *Acacia nitidula* is listed as Priority 3 on the DBCA Priority Flora List.
- Listing reference in a table: column heading: DBCA, row text: P3.

4 Priority 4: Rare, Near Threatened and other species in need of monitoring

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as a conservation dependent specially protected species.

(c) Species that have been removed from the list of threatened species or lists of conservation dependent or other specially protected species, during the past five years for reasons other than taxonomy.

(d) Other species in need of monitoring.

Examples of use:

- *Banksia aculeata* is listed as a Priority 4 species by the Department of Biodiversity, Conservation and Attractions.
- *Banksia aculeata* is listed as Priority 4 on the DBCA Priority Flora List.
- Listing reference in a table: column heading: DBCA, row text: P4.

[1] The definition of flora includes algae, fungi, and lichens.

[2] Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

[3] Schedules are not referred to when stating the listing status of threatened, extinct or specially protected species under the BC Act. See the examples provided under each listing category.

[4] Western Australia has assigned species to threat categories using the *IUCN Red List of Threatened Species Categories and Criteria* since 1996 (referencing all criteria). At the national level, threatened species listings under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) reference only some of the IUCN criteria (http://www.environment.gov.au/biodiversity/threatened/nominations/forms-and-guidelines).

[5] JAMBA - first included in the WA migratory species list in 1980.

[6] CAMBA - first included in the WA migratory species list in 2010.

[7] ROKAMBA - first included in the WA migratory species list in 2010.

[8] Bonn Convention (Birds) - first included in the WA migratory species list in 2015.

APPENDIX 6

Vegetation Patch Descriptions

APPENDIX 6

PATCH 1 (EASTERN SIDE OF ALBANY HIGHWAY, NORTH OF WARRENUP ROAD)			
Tree Canopy Species	*Eucalyptus occidentalis*		
Dominant Understorey Species	*Melaleuca* sp. Scattered *Acacia saligna* along roadside only (not native to Wheatbelt TEC)		
% Exotic Species for Wheatbelt TEC	<30 %	Vegetation Condition	Very Good
Wheatbelt TEC (Y/N)	Y	Wheatbelt TEC Category	A

APPENDIX 6

PATCH 2 (EASTERN SIDE OF ALBANY HIGHWAY, SOUTH OF WARRENUP ROAD)			
Tree canopy species	none		
Dominant Understorey Species	*Acacia saligna* (not native to Wheatbelt TEC)		
% Exotic Species for Wheatbelt TEC	100 %	Vegetation Condition	Good
Wheatbelt TEC (Y/N)	N	Wheatbelt TEC Category	-

APPENDIX 6

PATCH 3 (WESTERN SIDE OF ALBANY HIGHWAY)			
Tree canopy species	*Eucalyptus wandoo* *Eucalyptus occidentalis*		
Dominant Understorey Species	*Acacia rostellifera* (not native to Wheatbelt TEC) *Acacia ?microbotrya* (possible ID based on seed pods alone) *Jacksonia sternbergiana* *Callistemon phoeniceus* *Casuarina obesa*		
% Exotic Species for Wheatbelt TEC	>70 %	Vegetation Condition	Degraded
Wheatbelt TEC (Y/N)	N	Wheatbelt TEC Category	-