

APPENDIX C
BIODIVERSITY IMPACT
ASSESSMENT

EcoResolve



Environment & Design

Streamlined Biodiversity Development Assessment Report

**Cooranbong Stockpile Extension Project
(SSD-5145 Modification 4)**

Cooranbong Entry Site, NSW



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Document Control

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V1 – 21/08/2024	Draft for Client review	Lucy Dunton Alyce Dowling	Arne Bishop	Arne Bishop
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V3 – 24/01/2025	Final for Client issue	Brea Heidke	Arne Bishop	Arne Bishop

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Certification under clause 6.15 *Biodiversity Conservation Act 2016*.

I certify that this report has been prepared based on the requirements of, and information provided under, the Biodiversity Assessment Method and clause 6.15 of the *Biodiversity Conservation Act 2016* (BC Act).

Signature: 
 Date: 02/12/2024
 BAM Assessor Accreditation no:
 BAAS 17065

This S-BDAR has been prepared to meet the requirements of BAM 2020. **Appendix A** provides an assessment of compliance with the minimum information requirements outlined in BAM Appendix K.

Conflicts of interest.

I declare that I have considered the circumstances and there is no actual, perceived or potential conflict of interest.

Signature: 
 Date: 02/12/2024
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Abbreviations

Term	Description
APZ	Asset Protection Zone
BAM	Biodiversity Assessment Method (2020)
BAM-C	Biodiversity Assessment Method Calculator
BC Act	<i>Biodiversity Conservation Act 2016</i> (NSW)
BC Regulation	<i>Biodiversity Conservation Regulation 2017</i> (NSW)
Centennial	Centennial Northern Coal Services Pty Limited
S-BDAR	Streamlined Biodiversity Development Assessment Report
BOAMS	Biodiversity Offsets and Agreement Management System
BOS	Biodiversity Offsets Scheme
CEEC	Critically Endangered Ecological Community
CES	Cooranbong Entry Site
CHP	Coal Handling Plant
DBH	Diameter at Breast Height over bark
EC	Ecological Community
EEC	Endangered Ecological Community
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Federal)
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW)
HBT	Hollow Bearing Tree
HTW	High Threat Weed
IBRA7	Interim Biogeographic Regionalisation for Australia (version 7.0)
LGA	Local Government Area
LoO	Likelihood of Occurrence
LLS Act	<i>Local Land Services Act 2013</i> (NSW)
MNES	Matters of National Environmental Significance
NCS	Northern Coal Services
NPW Act	<i>National Parks and Wildlife Act 1974</i> (NSW)
NSW	New South Wales
PCT	Plant Community Type
ROM	Run-of-mine
SAII	Serious and Irreversible Impact
SEARs	Secretary's Environmental Assessment Requirements
SVTM	State Vegetation Type Map
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
VEC	Vulnerable Ecological Community
VI	Vegetation Integrity
VIS	Vegetation Integrity Score
Vegetation SEPP	State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 (NSW)

Executive Summary

Centennial Northern Coal Services Pty Limited (Centennial) is the operator of the Northern Coal Services Project (NCS) located on the western side of Lake Macquarie, approximately 25 kilometres (km) south-west of Newcastle and 140 km north of Sydney. NCS comprises surface coal handling and processing facilities at the Newstan Colliery surface site and Cooranbong Entry Site (CES), as well as private haul roads connecting Newstan Colliery, Awaba Colliery, CES and Eraring Power Station.

Centennial propose the CES Stockpile Extension Modification (hereafter referred to as the 'Project') to increase the capacity of an existing coal stockpile from 100 kilotons (kt) to 400kt. This will require clearing of 2.97 ha of Plant Community Type (PCT) 3583, *Hunter Coast Lowland Scribbly Gum Forest* (**Figure 3**). The condition of this vegetation (Vegetation Integrity Score (VIS) = 63.6) is above the threshold requiring offsets (≥ 17 for non-Endangered Ecological Communities (EECs)) and the associated offset liability is 84 ecosystem credits (PCT 3583). This PCT is not considered to form part of any EECs listed under the *Biodiversity Conservation Act 2016* (BC Act) or *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This assessment was conducted according to the streamlined module for small areas of the Biodiversity Assessment Method (BAM) 2020. Under this module, threatened species that are not considered at risk of Serious and Irreversible Impacts (SII species) and that are not recorded incidentally within the Modification Disturbance Area do not require specific assessment.

The surveys detected two (2) threatened flora and six (6) threatened fauna species (**Table 6**). Of the species detected, two (2) of the Fauna species are listed SII species, however, these were dual credit species and their habitat constraint for species credits (breeding habitat) has not been identified and they were retained as ecosystem credit/predicted species only. Similarly, two (2) more of the detected fauna were ecosystem credit species that were retained as predicted threatened species.

Of the above-mentioned species, six (6) dual credit or species credit species were assumed present or were recorded incidentally during surveys as follows:

- *Petaurus norfolcensis* (Squirrel Glider) (species credit species) – assumed present based on local records and secondary observations.
- *Calyptorhynchus lathami lathami* (Glossy Black-Cockatoo) (dual credit species) – actual nesting trees not recorded but included precautionarily for both ecosystem and species credits.
- *Tyto novaehollandiae* (Masked Owl) (species credit species) – recorded on site.
- *Lathamus discolor* (Swift Parrot) (dual credit and SII species) - assumed present based on the important habitat map.
- *Grevillea parviflora subsp. parviflora* (Small-flowered Grevillea) (species credit species) – recorded on site.
- *Tetradlea juncea* (Black-eyed Susan) (species credit species) – recorded on site.

The above listed species have been considered likely to be impacted as part of the Project and species credit liabilities have been calculated for them. Of these species, the Swift Parrot (*Lathamus discolor*) is listed as an SII species, and it has been considered further against the relevant SII criteria. This assessment concluded that although the species is in rapid decline, the small area of proposed



foraging habitat loss on the peripheries of the mapped important habitat (only ~1.1 ha is mapped within the proposed 2.97 ha Modification Disturbance Area) is unlikely to cause a decline of the species in the locality.

The Swift Parrot (*Lathamus discolor*) is also listed as Critically Endangered under the EPBC Act and therefore, an assessment of significance has been conducted (**Appendix F**). This assessment resulted in a potential for a significant impact to the species as part of the Project.

The Project will require an offset consisting of up to **84** ecosystem (**Table E1**) and a total of **534** species credits for various species (**Table E2 & Table E3**).

TABLE E1 - IMPACTS THAT REQUIRE AN OFFSET – ECOSYSTEM CREDITS

Common name	Scientific name	BC Act status	EPBC Act status	Impact area (ha)	Current VIS	Future VIS	Change in VIS	Biodiversity risk weighting	Number of ecosystem credits required
PCT 3583	<i>Hunter Coast Lowland Scribbly Gum Forest</i>	-	-	2.97	63.6	0	-63.6	Ecosystem credit 1.75	84
Total									84

TABLE E2. IMPACTS THAT REQUIRE AN OFFSET – SPECIES CREDITS

Common name	Scientific name	BC Act status	EPBC Act status	Loss of habitat (ha) or individuals	Biodiversity risk weighting	Number of species credits required
Black-eyed Susan	<i>Tetradlea juncea</i>	V	V	2.97 ha	Species credit 2.00	96
Masked Owl	<i>Tyto novaehollandiae</i>	V	-	2.97 ha	Species credit 2.00	96
Small-flower Grevillea	<i>Grevillea parviflora subsp. parviflora</i>	V	V	2.97 ha	Species credit 2.00	96
Squirrel Glider	<i>Petaurus norfolcensis</i>	V	-	2.97 ha	Species credit 2.00	96
Total						384



TABLE E3. IMPACTS THAT REQUIRE AN OFFSET – DUAL (SPECIES) CREDIT SPECIES

Common name	Scientific name	BC Act status	EPBC Act status	Loss of habitat (ha) or individuals	Biodiversity risk weighting	Number of species credits required
South-eastern Glossy Black-Cockatoo	<i>Calyptrorhynchus lathami lathami</i>	V	V	2.97 ha	Dual credit species 2.00	96
Swift Parrot	<i>Lathamus discolor</i>	E	CE	1.1 ha	Dual credit species 3.00	54
Total						150



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1. Introduction

1.1 Overview

EcoResolve Environment & Design (EcoResolve) have been commissioned by Centennial Northern Coal Services Pty Limited (Centennial), to prepare a streamlined Biodiversity Development Assessment Report (S-BDAR) in accordance with the Biodiversity Assessment Method Order 2020 (State of NSW and Department of Planning, Industry and Environment, 2020, and the requirements in the *NSW Biodiversity Conservation Act 2016* (BC Act). This report aims to address Section 6.12 of the BC Act which states “For the purposes of the biodiversity offsets scheme, a biodiversity development assessment report is a report prepared by an accredited person in relation to proposed development or activity that would be authorised by a planning approval, or proposed clearing that would be authorised by a vegetation clearing approval, that:

- a) assesses in accordance with the BAM the biodiversity values of the land subject to the proposed development, activity or clearing, and
- b) assesses in accordance with that method the impact of proposed development, activity or clearing on the biodiversity values of that land, and
- c) sets out the measures that the proponent of the proposed development, activity or clearing proposes to take to **avoid or minimise** the impact of the proposed development, activity or clearing, and
- d) specifies in accordance with that method the number and class of biodiversity credits that are required to be retired to offset the residual impacts on biodiversity values of the actions to which the biodiversity offsets scheme applies.”

1.2 Background

This S-BDAR has been prepared in association of the proposed modification Centennial is seeking for the Cooranbong Entry Site Stockpile Extension Modification (Northern Coal Services Project: SSD-5145 Modification 4), under Part 4 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act). The BC Act and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) also apply.

EcoResolve was engaged to produce the S-BDAR for Centennial for the proposed Cooranbong Stockpile Extension Project (the ‘Project’). Initially, the disturbance area covered an area of >3 ha and therefore, candidate species surveys were undertaken to inform a BDAR. The *Biodiversity Conservation Regulation 2017* (BC Regulation) requires the application of the BAM. However, the disturbance area was subsequently reduced to approximately 2.97 ha. Clearing of ≤3 ha of native vegetation on land with a minimum lot size of 40 ha may be assessed using the small areas streamlined assessment module in Appendix C of the BAM (S-BDAR).

CES was originally developed as part of the Cooranbong Colliery in 1981. It comprises a coal handling plant (CHP), coal stockpiles, coal conveyors, mine entries for access to Mandalong Mine, workshop and administration buildings, car parking, water management structures and other associated infrastructure. Since 2015, CES has formed part of the coal handling and logistics activities authorised by SSD-5145 and is approved to operate 24 hours a day, seven days per week until the 31 December 2045.

1.3 Location

CES is located at the end of Gradwell's Road, Dora Creek NSW 2264. The Project area is west of the existing CES ROM coal stockpile (**Figure 1**).

1.4 The Project

Centennial are preparing an application under Section 4.55(2) of the EP&A Act (Northern Coal Services Project: SSD-5145 Modification 4) for:

- Development of the existing coal stockpile at CES to increase capacity from 100,000 tonnes to 400,000 tonnes; and
- Construction of infrastructure associated with the modified stockpile footprint. This will include access tracks, lighting towers, water sprays, fencing and water management infrastructure.

Project will require clearing of approximately 2.97 ha of native vegetation.

The Project assessed in this S-BDAR involved:

- Identifying the Disturbance Boundary of the proposed stockpile extension area (Modification Disturbance Boundary) (**Figure 1**).
- Surveying SAI species and recording incidental observations of threatened species within the Modification Disturbance Boundary.

1.5 Biodiversity Offsets Scheme entry

The Biodiversity Offset Scheme (BOS) applies to proposed developments that meet the following thresholds for significant impacts on biodiversity:

- Local development (assessed under Part 4 of the EPBC Act) that is likely to significantly affect threatened species. Local development is likely to significantly affect threatened species and require a S-BDAR (Section 7.7 of the BC Act) if impacts either:
 - exceed the Biodiversity Offsets Scheme threshold (BC Act, Section 7.4).
 - the threshold includes clearing on land within the Biodiversity Values Map or clearing of an area that exceeds the threshold; or
 - are carried out on an Area of Outstanding Biodiversity Value; or
 - are likely to significantly affect threatened species, ecological communities and their habitats according to the test in Section 7.3 of the BC Act.
- State significant development and state significant infrastructure projects, unless the Secretary of the Department of Planning and Environment and the environment agency head determine that the project is not likely to have a significant impact.

The Project requires clearing of approximately 2.97 ha of native vegetation and is a modification to an SSD (5145), triggering entry into the BOS.

1.6 Information sources

The information sources consulted during this assessment include:





- BAM 2020.
- BAM Stage 1 and Stage 2 Operational Manuals.
- BioNet Threatened Biodiversity Data Collection (TBDC).
- BioNet Vegetation Identification System (VIS).
- Interim Biogeographic Regionalisation for Australia (IBRA) regional and subregional mapping.
- Mitchell Landscapes mapping and associated literature.
- Latest available high-resolution imagery.
- Available drainage and wetland mapping.
- Regional vegetation mapping from the NSW State Vegetation Type Map to identify Plant Community Types (PCTs) that may be occurring within the site.
- A review of existing vegetation mapping, habitat mapping and reports of relevance to the site and surrounding locality (e.g., 10km).
- Database searches to identify records of the threatened entities and Matters of National Environmental Significance (MNES) that may occur within 20 kilometres of the site, including:
 - NSW Government BioNET Atlas database.
 - Department of the Environment (DoE) Protected Matters Search Tool.
 - A Likelihood of Occurrence (LoO) analysis for all threatened species and communities identified through desktop research.

1.7 Other documentation

The ecology in and around the CES surface facilities has previously been assessed by Hunter Eco in September 2010. The Hunter Eco assessment included vegetation community classification and mapping the spatial distribution of these communities. This report provided an endangered ecological communities assessment and identification of threatened species.

1.8 Matters of National Environmental Significance

Matters of national environmental significance (MNES) and their consideration are legislated under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). They include:

- World heritage properties.
- National heritage places.
- Wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed).
- Nationally threatened species and ecological communities.
- Migratory species.
- Commonwealth marine areas.
- The Great Barrier Reef Marine Park.
- Nuclear actions (including uranium mining).
- A water resource, in relation to coal seam gas development and large coal mining development.





No EPBC Act listed threatened ecological communities (TECs) were identified within the Modification Disturbance Boundary nor are any likely to be impacted by the Project.

A self-assessment process determined if any MNES likely or known to occur within the proposed action area was likely to be significantly impacted by the proposed action (refer to **Appendix F**). The assessment process considered both desktop and field survey results. Assessments of Significance (AoS) for MNES likely to be impacted were undertaken in accordance with the Significant Impact Guidelines 1.1 for MNES (DEWHA, 2013).

The proposed action is likely to have a significant impact upon two (2) MNES species, *Grevillea parviflora subsp. parviflora* (Small Flowered Grevillea), and *Tetralathea juncea* (Black-eyed Susan), and may potentially impact a further nine (9) MNES species, including four (4) orchid species: *Corunastylis insignis* (syn. *Genoplesium insigne*) (Variable Midge Orchid), *Corunastylis* sp. Charmhaven (syn. *Genoplesium branwhiteorum*), *Rhizanthella slateri* (Eastern Underground Orchid), and *Thelymitra adorata* (Wyong Sun Orchid), and five (5) fauna species: *Calyptorhynchus lathami lathami* (Glossy Black-Cockatoo), *Petaurus australis* (Yellow-bellied Glider), *Pteropus poliocephalus* (Grey-headed Flying Fox), *Lathamus discolor* (Swift Parrot), and *Phascogale cinereus* (Koala).

2. Landscape Context

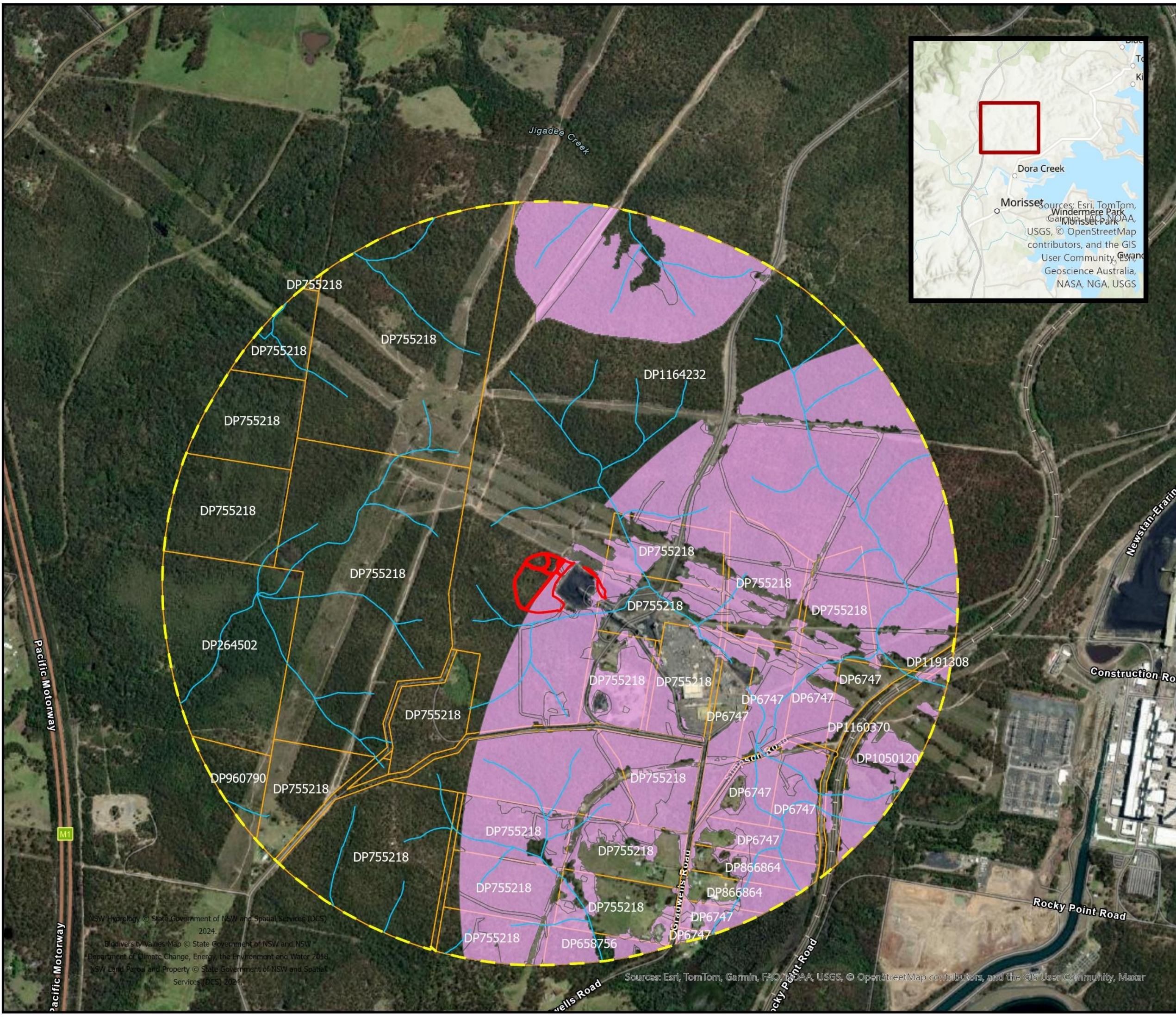
The assessment area includes the Modification Disturbance Area and the area of land within a 1,500-metre buffer zone surrounding it (**Figure 2**). A summary of relevant landscape features identified within the Modification Disturbance Area and assessment area is detailed in **Table 1**.

TABLE 1 - LANDSCAPE ASSESSMENT

Landscape	Modification Disturbance Area
IBRA7 region	Sydney Basin (SYB)
IBRA7 subregion	Wyong (SYB06)
Rivers, streams, estuaries and wetlands	None present
Habitat connectivity	Yes – the site is surrounded by bushland which connects to the Watalgan's National Park. The major barriers to wildlife movement are likely to be fences and roads.
Karst, caves, crevices, cliffs, rocks, or other geological features of significance	None present
Areas of outstanding biodiversity value	Yes – the site is surrounded by bushland, which has been mapped as having significant biodiversity values (SEED, 2023).
Mitchell Landscape (v3.1)	Gosford - Cooranbong Coastal Slopes
Native vegetation cover within the assessment area	~2.97 ha

Cooranbong Entry Site Stockpile Extension Project

Figure 1 Site Location



LEGEND

- Modification Disturbance Area
- 1500 m buffer
- Project Boundary

- LEGEND**
-  Modification Disturbance Area
 -  1500 m buffer
 -  Project Boundary

Hydrolines

— Watercourse Line

- Hydrolines**
- Watercourse Line

Biodiversity Values

Threatened species or communities with potential for serious and irreversible impacts

- Biodiversity Values**
- Threatened species or communities with potential for serious and irreversible impacts

NSW Land Parcel and Property

Lot

- NSW Land Parcel and Property**
- Lot



0 375 750 Metres

Scale: 1:1,600

Datum:	WGS 1984
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Version: D - A3

Date: 24/01/2025

Author: RH

Author:	BH
Reference:	ER092

Reference	Grade
1	2

EcoResolve



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Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Maxar

NSW Land Parcel and Property © State Government of NSW and Spatial Services (DCS) 2024.

Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Maxar

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Figure 2. Landscape

LEGEND

 1500 m buffer

 Modification Disturbance Area

Hydrolines

 Watercourse Line

IBRA7 Region

 Sydney Basin (SYB)

IBRA7 Sub Region

 Wyong

Mitchell Landscapes

 Gosford - Cooranbong Coastal Slopes

 Sydney - Newcastle Coastal Alluvial Plains

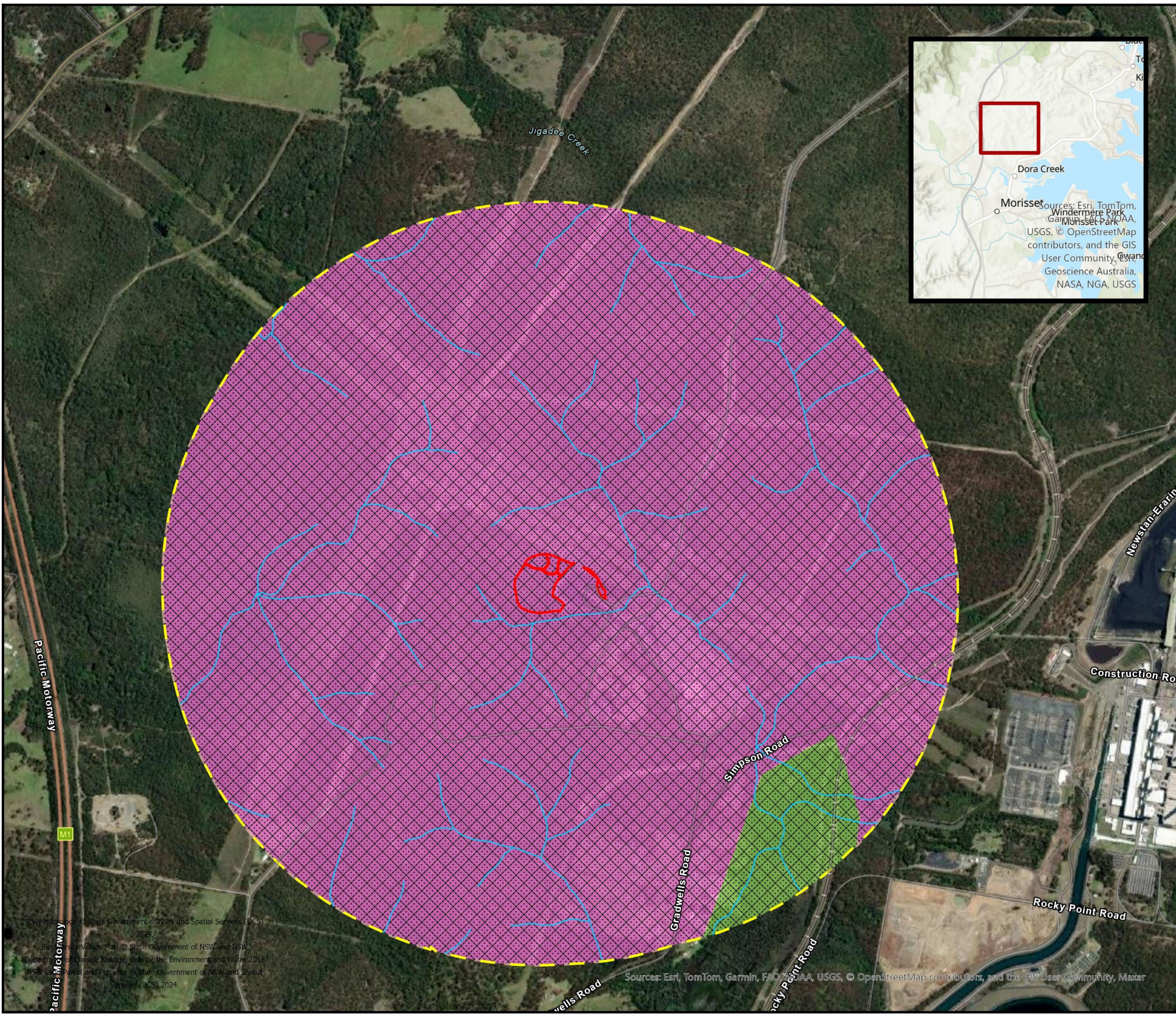
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0 375 750 Metres



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Date:	24/01/2025
Author:	BH
Reference:	ER092



3. Native vegetation

This section addresses the requirements set out in Sections 4.1 – 4.4 of the BAM in assessing native vegetation, threatened ecological communities and vegetation integrity (Chapter 4, DPIE, 2020). The identification and mapping of all PCTs and Threatened Ecological Communities (TECs) on the site have been categorised according to the NSW PCT classification as described in the BioNet Vegetation Information System (VIS).

3.1 Plot-based vegetation survey

Vegetation surveys which included BAM plots were completed on 22/06/2023 and 8/08/2024. These surveys were completed in accordance with BAM. Further details are outlined below, and these surveys were used to inform preparation of a vegetation map of the Modification Disturbance Area (**Figure 3**).

Flora surveys included (**Figure 4 – Figure 6**):

- Delineation of the type and extent of native PCTs vegetation cover (including any EECs) and threatened species habitat.
- Collection of BAM plots.
- Targeted searches for candidate flora species identified during desktop research.
- Evaluation of the presence of EECs and, where present, mapping the EECs.
- Compilation of a flora species list identifying native and exotic plant species, including priority weeds listed under the NSW *Biosecurity Act 2015* within the Local Government Area (LGA).
- Habitat assessments including high concentrations hollow bearing trees (HBT).
- Weed density and distribution mapping.

Three (3) vegetation integrity (VI) plots were undertaken in accordance with BAM to measure the VI (i.e., composition, structure and functional components) of the sites' native vegetation cover. BAM plots were placed in locations that were representative of the vegetation zones being assessed. That is, BAM plots were placed beyond the prescribed minimum distance from ecotones, tracks and other areas of disturbance.

Each plot included:

- One standard 20 x 20 m plot, to assess the vegetation composition and structure attributes, including trees, shrubs, grasses, forbs, ferns and other growth forms.
- One standard 20 x 50 m plot (1,000 m²) to assess the function attributes: number of large trees (i.e., > 50 cm DBH), stem size class, tree regeneration, length of fallen logs, high threat exotic vegetation cover and hollow-bearing trees.
- Five 1 m² sub-plots to assess average litter cover for the plots.

The vegetation community identified on site occurred in high condition, and vegetation zones were assigned accordingly. See **Appendix C** for vegetation survey data.

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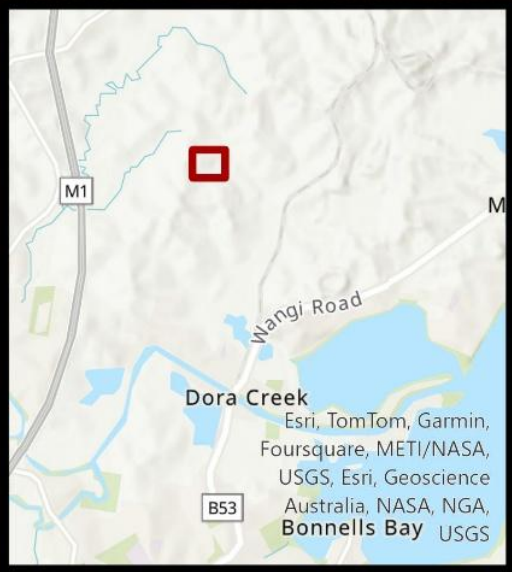
**Cooranbong Entry Site
Stockpile Extension Project**

Figure 3 Vegetation

- LEGEND**
- Modification Disturbance Area
 - BAM Plot**
 - ⊙ BAM Plot Location
 - Plant Community Type (PCT)**
 - PCT 3583 (High)



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Datum:	WGS 1984
Version:	C - A3
Date:	25/11/2024
Author:	BH
Reference:	ER092



3.2 Identification of Plant Community Types and Threatened Ecological Communities

The vegetation community present and considered to be the best fit for the vegetation on site was identified as PCT 3583, *Hunter Coast Lowland Scribbly Gum Forest* (**Figure 3**). This PCT is not considered to form part of any BC Act or EPBC Act listed EECs. **Appendix C** includes a list of the plant species which were identified during the site visits.

Table 2 - PCT Identification

Identification	Project site
PCT ID	3583
PCT name	Hunter Coast Lowland Scribbly Gum Forest
Vegetation formation	Dry Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	Sydney Coastal Dry Sclerophyll Forests
Per cent cleared value (%)	100%
Extent within the Modification Disturbance Area (ha)	~2.97 ha (of native vegetation associated with PCT 3583)
Condition	High
Key diagnostic species	<i>Epacris pulchella</i> , <i>Ptilothrix deusta</i> , <i>Petrophile pulchella</i> , <i>Lomandra obliqua</i> , <i>Themeda australis</i> , <i>Lepyrodia scariosa</i> , <i>Aristida warburgii</i>
Description	Eucalypt dominated dry sclerophyll forest with a shrubby mid-stratum and a graminoid ground cover. The community occurs on coastal lowlands from northern Tuggerah Lake to the northern end of Lake Macquarie. The substrate is sandstone with moist sandy soils. Elevation is usually under 100m
Vegetation zones	3583_high

3.3 Patch size

Patch size was calculated according to Section 4.3.2 of the BAM 2020. Adjacent areas of planted native canopy trees were included if there were no roads separating them from the native vegetation on the Modification Disturbance Area. The patch size was in excess of 200 ha, placing it into the >100 ha class.

3.4 Calculation of current vegetation integrity

PCT 3583 occurs on the Modification Disturbance Area in high condition, which is distinguished by the density of canopy species and woody vegetation. High condition areas have a relatively intact canopy layer that generally reflects the expected structure of vegetation from this formation. All native vegetation within the Modification Disturbance Area forms part of a contiguous tract extending throughout the surrounding landscape and the >100 ha patch size class was assigned to both vegetation zones.

Section 9.2.1 of the BAM establishes VI thresholds above which an offset for direct impacts to native vegetation are required (**Table 4**). The VI of the native vegetation is 64.9, therefore, an ecosystem credit offset is required.

**TABLE 3 – CHANGE IN VEGETATION INTEGRITY SCORE**

Vegetation zone	PCT ID	Management zone	Area (ha)	Before development				After development			Change	
				Composition	Structure	Function	VI score	Composition	Structure	Function	VI score	Change in VI score
3583_High	3583	1	2.97 ha	38.6	72.1	98.1	64.9	0	0	0	0	-64.9

TABLE 4 - THRESHOLDS FOR OFFSETTING DIRECT IMPACTS TO NATIVE VEGETATION (SECTION 9.2.1, BAM 2020).

Vegetation characteristics	VI threshold for offsetting
Where the PCT is representative of an EEC or a CEEC	≥15
Where the PCT is associated with threatened species habitat (as represented by ecosystem credits) or represents a vulnerable ecological community	≥17
Where the PCT does not represent a TEC and is not associated with threatened species habitat.	≥20



4. Threatened species

The streamlined assessment module for small areas allows assessors to forego assessment of non-SAI threatened species if they have not been detected incidentally within the Modification Disturbance Area. Only SAI species which may occur on the Modification Disturbance Area are required to be assessed using Steps 3–5 of Section 5.2 of the BAM.

Four fauna species at risk of SAI were identified as having moderate to high likelihoods of occurring within the Modification Disturbance Area:

- *Anthochaera phrygia* (Regent Honeyeater),
- *Lathamus discolor* (Swift Parrot),
- *Miniopterus australis* (Little Bent-winged Bat) and
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat).

The Project site is not within an area mapped as important habitat for the *Anthochaera phrygia* (Regent Honeyeater), therefore it was not considered further. However, the Project site is within an area mapped as important habitat for the *Lathamus discolor* (Swift Parrot).

Furthermore, the two Bent-winged Bat species are dual credit species and require consideration of breeding habitat constraints as part of the surveys.

4.1 Review of existing information

Hunter Eco reported on the ecology in and around the CES surface facilities in 2010. Through their surveys, two threatened flora species were recorded: *Tetratheca juncea* (Black-eyed Susan) and *Grevillea parviflora subsp. parviflora* (Small-flower Grevillea). At the time, these species were listed as Vulnerable at the NSW State and Australian Commonwealth level. Their status remains the same for both the BC and EPBC Act.

EcoResolve used a Likelihood of Occurrence (LoO) analysis to compile a list of species with some likelihood of occurring on the Modification Disturbance Area and determine those with potential to be impacted by the Project. The LoO generates a list of potentially occurring species by cross-referencing the list of predicted and potential candidate species generated by the BAM-C, BioNet atlas records within 10 km of the Modification Disturbance Area and the results of a PMST search. Following site surveys, the LoO incorporates information about the suitability of habitat and the level of survey effort to produce a list of species which require further consideration. This process supports the BAM assessment.

The desktop assessment resulted in 90 threatened fauna and 34 threatened flora species being identified as having at least some LoO. The LoO assessment, which is presented in **Appendix B**, assessed the likelihood of occurrence of those 124 threatened species and of those, 65 were considered to have a moderate, high or known LoO.

4.2 Weather conditions

Weather conditions are known to significantly affect the likelihood of detection of some threatened species. Fauna surveys were conducted at times when weather conditions were neutral, if not optimal



for the detection of weather-sensitive species, and in accordance with relevant guidelines and recommendations. Data was obtained from the Bureau of Meteorology (BoM) website (station 061412). **Appendix D** details the timing and environmental conditions of flora and fauna surveys.

4.3 Field surveys

A diverse range of threatened species were considered to have at least some likelihood of occurring on the Modification Disturbance Area (see **Appendix B**) and a variety of survey methods were used to investigate their presence (**Table 5**). Flora and fauna surveys across the Modification Disturbance Area were conducted with reference to the current guidelines and accepted practices during October 2022 – July 2024.



TABLE 5 – CANDIDATE THREATENED SPECIES SURVEYS ON THE MODIFICATION DISTURBANCE AREA

Common name	Scientific name	BC Act	EPBC Act	Survey method	Threatened species surveys Timing of survey –within recommended period?	Effort (hours and no. people)	Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
FLORA								
Variable Midge Orchid	<i>Corunastylis insignis</i> Syn. <i>Genoplesium insigne</i>	CE	CE	5m flora transects	11/10/2022-12/10/2022 -within recommended survey period	~160 person hours 4 people	NO	NO
Charmhaven Midge Orchid	<i>Corunastylis</i> sp. <i>Charmhaven</i>	CE	CE	5m flora transects	11/10/2022-12/10/2022 -within recommended survey period	~160 person hours 4 people	NO	NO
Small-flowered Grevillea¹	<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	V	V	5m flora transects	11/10/2022-12/10/2022 -within recommended survey period	~60 person hours 4 people	YES	YES
Eastern underground orchid	<i>Rhizanthella slateri</i>	V	E	5m Flora Transects	11/10/2022-12/10/2022 -within recommended survey period	~60 person hours 4 people	NO	NO
Black-eyed Susan²	<i>Tetradthea juncea</i>	V	V	5m Flora Transects	11/10/2022-12/10/2022 -within recommended survey period	~60 person hours 4 people	YES	YES
Wyong Sun Orchid	<i>Thelymitra adorata</i>	CE	CE	5m Flora Transects	11/10/2022-12/10/2022 -within recommended survey period	~160 person hours 4 people	NO	NO
FAUNA								
Regent Honeyeater³	<i>Anthochaera phrygia</i>	CE	CE	Opportunistic Survey, Dawn and Dusk Bird Survey	14/2/2023 – 16/2/2023- within recommended survey period Opportunistic- 12/10/2022, 22/6/2023	Standard Bird Survey ~32 hours 2 people Opportunistic ~200 people hours 4 people	NO	NO
Glossy Black-Cockatoo⁴	<i>Calyptorhynchus lathami lathami</i>	V	V	Opportunistic Survey, Dawn and Dusk Bird Survey, Camera traps, survey to confirm potential and actual nest trees.	14/2/2023 – 16/2/2023- within recommended survey period Camera Traps - 16/07/2024-26/07/2024 within recommended survey period	Standard Bird Survey ~32 hours 2 people Opportunistic ~200 people hours 4 people Camera Traps ~264 hours 2 people	YES	YES
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	V	V	Anabat	11-15/12/2023 within recommended survey period.	~192 person hours 2 people	NO	NO
Swift Parrot⁵	<i>Lathamus discolor</i>	E	CE	Opportunistic Survey, Dawn and Dusk Bird Survey	14/2/2023 – 16/2/2023- within recommended survey period Opportunistic- 12/10/2022, 22/6/2023	Standard Bird Survey ~32 hours 2 people Opportunistic ~200 people hours 4 people	NO	NO
Eastern Coastal Free-tail Bat⁶	<i>Micronomus norfolkensis</i>	V	-	Anabat	13-17/02/2023, 11-15/12/2023 within recommended survey period.	~192 hours	YES	YES
Little Bentwing-bat	<i>Miniopterus australis</i>	V	-	Anabat	13-17/02/2023, 11-15/12/2023 within recommended survey period.	~192 hours	YES	YES
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	V	-	Anabat	13-17/02/2023, 11-15/12/2023 within recommended survey period.	~192 hours	YES	YES

¹ This species was added manually due to being recorded during surveys.

² This species was added manually due to being recorded during surveys.

³ The Project site is not within an area mapped as important habitat and targeted surveys failed to detect the species, consequently, this species is not considered further as part of the assessment.

⁴ This species was added manually due to being recorded during surveys.

⁵ This project site is mapped as important habitat for this species. Consequently, the species is assumed present.

⁶ Although this species was recorded within the Project site during targeted surveys, this species is an ecosystem credit species, and no further assessment is required.

Common name	Scientific name	BC Act	EPBC Act	Survey method	Threatened species surveys		Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
					Timing of survey –within recommended period?	Effort (hours and no. people)		
Stuttering Frog	<i>Mixophyes balbus</i>	E	V	Call Playback, Spotlighting	02/12/2022 within recommended survey period	~40 person hours 4 people	NO	NO
Squirrel Glider ⁷	<i>Petaurus norfolcensis</i>	V	-	Call Playback, Spotlighting, Camera Traps	Spotlighting- Nov 2022, Call Playback- 22/05/2023 Camera Traps-13/2/2023-17/2/2023 within recommended survey period	~50 person hours 4 people	Assumed	NO
Brush-Tailed Rock-Wallaby	<i>Petrogale penicillate</i>	E	V	Camera Traps, Spotlighting	Spotlighting- Nov 2022 Camera Traps-13/2/2023-17/2/2023 within recommended survey period	~40 person hours 4 people	NO	NO
Yellow-bellied Sheathtail-bat ⁸	<i>Saccolaimus flaviventris</i>	V	-	Anabat	13-17/02/2023, 11-15/12/2023 within recommended survey period.	~192 hours	YES	YES
Masked Owl ⁹	<i>Tyto novaehollandiae</i>	V	-	Call Playback, Spotlighting	22/05/2023; 18,22- 24/07/2024 within recommended survey period	~60 person hours 4 people	YES	YES
Eastern Cave Bat	<i>Vespadelus troughtoni</i>	V	-	Anabat	11-15/12/2023 within recommended survey period.	~192 hours	NO	NO

⁷ This species has been added manually and assumed present on the basis of secondary observations and local records.

⁸ This species was added manually due to being recorded during surveys.

⁹ This species was added manually due to being recorded during surveys.

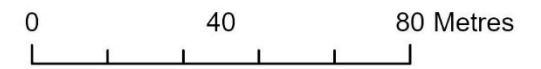
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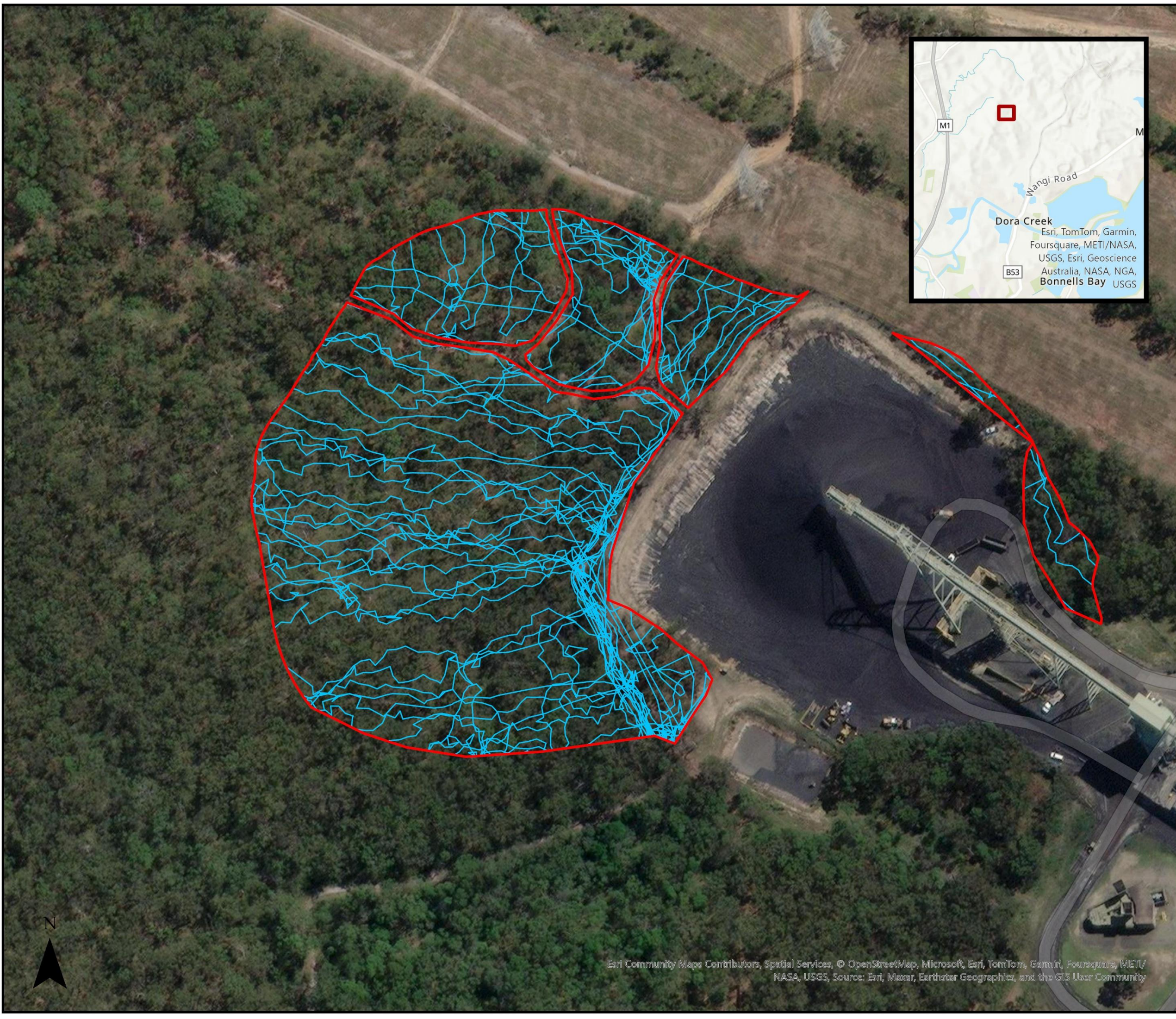
**Figure 4 Threatened
Flora Surveys
(October 2022)**

LEGEND

-  Modification Disturbance Area
- Threatened Flora Transect**
-  October 2022



Scale:	1:1,600
Datum:	WGS 1984
Version:	E - A3
Date:	25/11/2024
Author:	BH
Reference:	ER092



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**Figure 5 Threatened
Flora Surveys
(February 2023)**

LEGEND

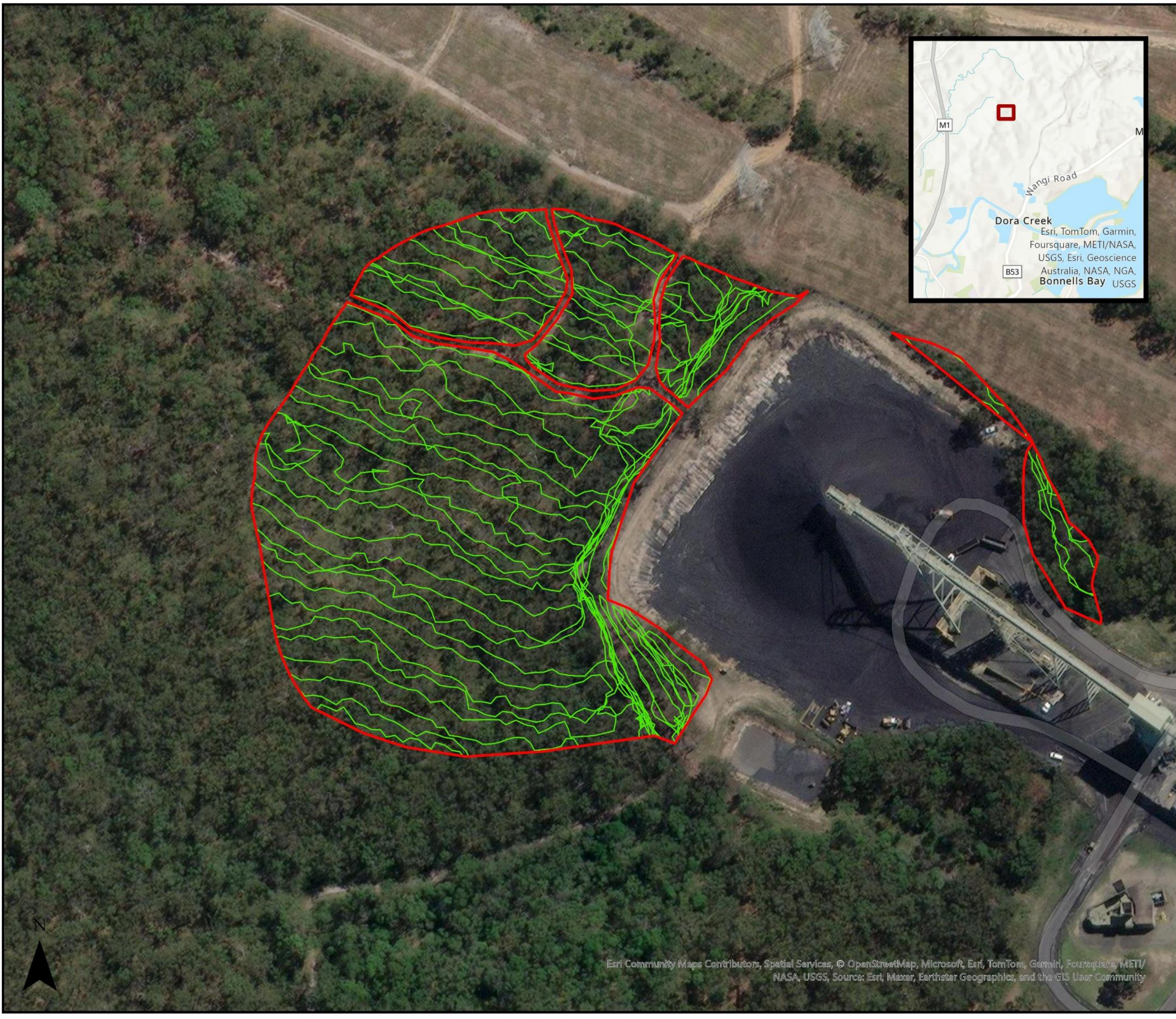
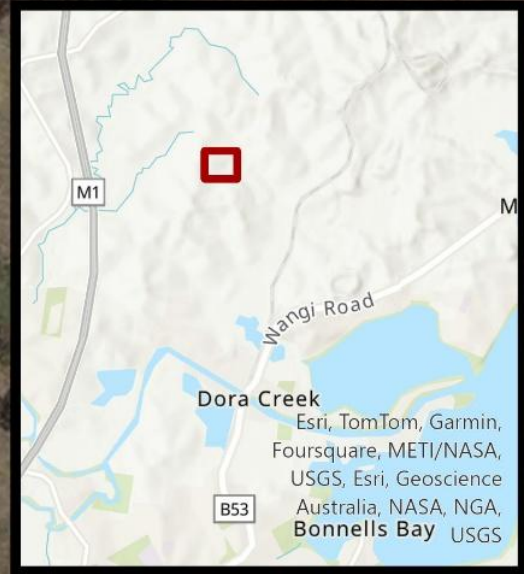
 Modification Disturbance Area

Threatened Flora Transect

 February 2023



Scale:	1:1,600
Datum:	WGS 1984
Version:	E - A3
Date:	25/11/2024
Author:	BH
Reference:	ER092



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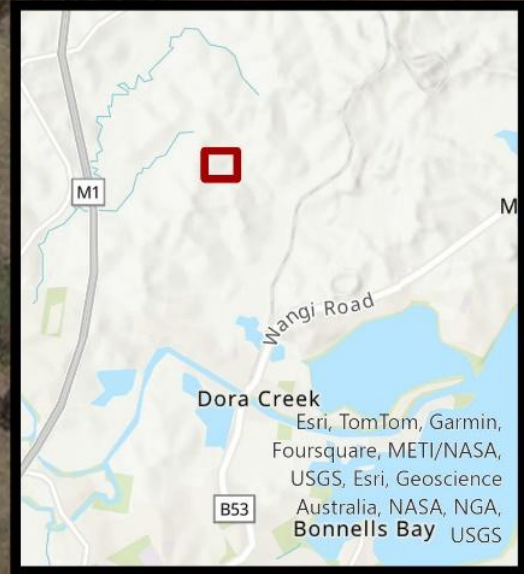
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**Figure 6 Threatened
Flora Surveys
(June 2023)**

LEGEND
 Modification Disturbance Area
 June 2023

0 40 80 Metres

Scale:	1:1,600
Datum:	WGS 1984
Version:	E - A3
Date:	25/11/2024
Author:	BH
Reference:	ER092



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**Figure 7 Fauna
Surveys**

- LEGEND**
- Anabat
 - Frog Survey
 - Call Playback
 - Funnel Trap
 - Spotlighting May 2023
 - Spotlighting July 2024
 - Arboreal
 - Ground
 - Glossy-black Cockatoo
 - Modification Disturbance Area

0 40 80 Metres

Scale:	1:1,600
Datum:	WGS 1984
Version:	E - A3
Date:	25/11/2024
Author:	BH
Reference:	ER092

4.4 Survey results

The surveys detected two (2) threatened flora and six (6) threatened fauna (**Table 6**). For the location of detected threatened species, refer to **Figure 8**.

Of the species detected, two (2) are listed SAI species; Large Bent-winged Bat (*Miniopterus orianae oceanensis*) and Little Bentwing-bat (*Miniopterus australis*) **Appendix G**. However, these two SAI species are dual credit species and their habitat constraint for species credits (breeding habitat) has not been identified. Another SAI species known as Swift Parrot (*Lathamus discolor*) has been assumed present on the basis of important habitat being mapped within the Modification Disturbance Area.

Several other species were considered likely to occur or were recorded incidentally during surveys and were considered further:

- *Petaurus norfolcensis* (Squirrel Glider) (species credit species)
- *Calyptorhynchus lathami lathami* (Glossy Black-Cockatoo) (dual credit species)
- *Tyto novaehollandiae* (Masked Owl) (species credit species)
- *Micronomus norfolkensis* (Eastern Coastal Free-tail Bat) (ecosystem credit species)
- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat) (ecosystem credit species)

Two (2) threatened flora species were incidentally recorded during field surveys and are likely to be impacted:

- *Grevillea parviflora subsp. parviflora* (Small-flowered Grevillea) (species credit species)
- *Tetradlea juncea* (Black-eyed Susan) (species credit species)

Of the above listed species, the *Micronomus norfolkensis* (Eastern Coastal Free-tail Bat) and the *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat) are ecosystem credit species and they were retained as predicted threatened species in the BAM-C.

The *Calyptorhynchus lathami lathami* (Glossy Black-Cockatoo) is a dual credit species (ecosystem and species credit species) and further investigations were undertaken to establish if the habitat constraints associated with the species credits (breeding habitat in the form of actual nest trees) are present. In this case it required additional surveys with reference to BioNet and EcoResolve conducted additional surveys as outlined briefly below.

EcoResolve conducted surveys for the Glossy Black-Cockatoo to identify signs of breeding and mapped potential nest trees where hollows were at least 8 m above the ground; and hollow diameter is at least 15 cm. Five trees that contained these parameters were marked and Camera traps were deployed to monitor these tree hollows during the breeding season for ten (10) days (16/07/2024-26/07/2024) to confirm presence of any actual nest trees on site. Because no actual nest trees were identified during the further comprehensive surveys, it can be deduced that there is no breeding currently taking place within the site. Whether the absence of actual nest trees constitutes enough evidence to suggest that species credit offsets are not required is up to the determining authority and species credit offsets have been calculated precautionarily until confirmation is obtained.

TABLE 6 - THREATENED SPECIES RECORDED WITHIN THE MODIFICATION DISTURBANCE AREA

Common name	Scientific name	BC Act	EPBC Act	Date(s) observed	Surveyor(s)	Survey method	Biodiversity risk weighting	SAIL entity	Species count (total)	Habitat constraints / microhabitat present on the Subject land / vegetation zone (BioNet, 2024)	Extent (ha) of suitable habitat present on site	TBDC species specific recommendations e.g. buffers, general comments (where relevant) (BioNet, 2024)	Habitat condition
Black-eyed Susan	<i>Tetradthea juncea</i>	V	V	11/10/2022 - 12/10/2022	Julian Carson Mel Thurtell	5 m flora transect	Species credit 2.00	No	86	Present-open Forest/woodland with a mixed shrub understorey and grassy groundcover. Generally, prefers well-drained sites below 200m elevation and annual rainfall between 1000 - 1200mm. The preferred substrates are sandy skeletal soil on sandstone, sandy-loam soils, low nutrients; and clayey soil from conglomerates, pH neutral.	2.97 ha	Large populations of this species are particularly important. Protect and actively manage large populations and those at the limit of the species range through conservation mechanisms such as covenanting and the preparation/implementation of site-specific vegetation management plans. Improve vegetative connectivity within and between populations through revegetation/regeneration programs. When <i>Tetradthea juncea</i> is recorded within an assessment area, the species polygon does not necessarily need to extend over the whole zone for a given Plant Community Type where the species is detected. Suitable habitat may be modified to restrict the polygon to low nutrient, well drained soils on substrates that are generally sandy skeletal soil on sandstone or sandy-loam, or pH neutral clayey soil from conglomerates.	Good
Eastern Coastal Free-tail Bat	<i>Micronomus norfolkensis</i>	V	-	13-17/02/2023, 11-15/12/2023	Wingbeat Ecology	Anabat	Ecosystem credit	No	9 passes	Present - dry sclerophyll forest. Roost mainly in tree hollows but will also roost under bark or in man-made structures. Frequently changes breeding sites, making it challenging to confirm locations. Although it breeds in hollows, it exhibits a nomadic breeding behaviour, occasionally forming large breeding groups, even in man-made structures.	2.97 ha	The species was allocated to ecosystem credit class (rather than dual credit species) because whilst it does breed in hollows it will usually change breeding sites regularly (every few days), rendering it very difficult to confirm breeding sites. Additionally, selected <1 for average number of offspring because females do not give birth every year (often miscarry etc). Retain hollow-bearing trees and provide for hollow tree recruitment. Retain foraging habitat.	Good
Glossy Black-Cockatoo	<i>Calyptorhynchus lathami lathami</i>	V	V	16/02/2023	Brea Heidke Mel Thurtell	Opportunistic	Dual credit species 2.00	No	1	Present - Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (<i>Allocasuarina littoralis</i>) and Forest Sheoak (<i>A. torulosa</i>) are important foods. Feeds almost exclusively on the seeds of several species of she-oak (<i>Casuarina</i> and <i>Allocasuarina</i> species), shredding the cones with the massive bill. Feeds almost exclusively on the seeds of several species of she-oak (<i>Casuarina</i> and <i>Allocasuarina</i> species), shredding the cones with the massive bill. Dependent on large	2.97 ha	Where potential nest trees are identified on site, monitor for this species during the breeding season (Apr – Aug) to confirm the presence of any actual nest trees on site.	Good

Common name	Scientific name	BC Act	EPBC Act	Date(s) observed	Surveyor(s)	Survey method	Biodiversity risk weighting	SAIL entity	Species count (total)	Habitat constraints / microhabitat present on the Subject land / vegetation zone (BioNet, 2024)	Extent (ha) of suitable habitat present on site	TBDC species specific recommendations e.g. buffers, general comments (where relevant) (BioNet, 2024)	Habitat condition
										hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.			
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	V	-	13-17/02/2023, 11-15/12/2023	Wingbeat Ecology	Anabat	Dual credit species 3.00	Yes	8 passes	Foraging habitat present - Hunt in forested areas, catching moths and other flying insects above the tree tops. No breeding habitat present, consequently, no Species Credits generated for this dual credit species.	2.97 ha	Any impacts on breeding habitat could be considered potentially serious and irreversible. This species is retained as dual credit because foraging habitat is broad ranging, but breeding habitat is highly specific. At lower altitudes this species is usually more abundant during winter months, the lower numbers of individuals from October to February are due to females moving to maternity sites. Additionally, selected <1 for average number of offspring because females do not give birth every year (often miscarry etc). Potential breeding habitat is caves, tunnels, mines or other structures known or suspected to be used by <i>M. schreibersii oceanensis</i> including species records in BioNet with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers of individuals >500; or from the scientific literature. All breeding habitats including the cave, or other features, used for breeding and the area immediately surrounding this feature must be mapped. Species polygon boundaries should have a 100 m radius buffer around an accurate GPS point location centred on the cave/feature entrance. Surveys must be undertaken as per the Threatened Bat Survey Guide to confirm breeding habitat.	Good
Little Bentwing-bat	<i>Miniopterus australis</i>	V	-	13-17/02/2023, 11-15/12/2023	Wingbeat Ecology	Anabat	Dual credit species 3.00	Yes	27 passes	Foraging habitat present - dry sclerophyll forest and at night forage for small insects beneath the canopy of densely vegetated habitats. No breeding habitat present, consequently, no Species Credits generated for this dual credit species.	2.97 ha	Any impacts on breeding habitat could be considered potentially serious and irreversible. The is retained as dual credit because foraging habitat is broad ranging, but breeding habitat is highly specific. Additionally, selected <1 for average number of offspring because females do not give birth every (often miscarry etc). All breeding habitats including the cave, or other features, used for breeding and the area immediately surrounding this feature must be mapped. Species polygon	Good

Common name	Scientific name	BC Act	EPBC Act	Date(s) observed	Surveyor(s)	Survey method	Biodiversity risk weighting	SAIL entity	Species count (total)	Habitat constraints / microhabitat present on the Subject land / vegetation zone (BioNet, 2024)	Extent (ha) of suitable habitat present on site	TBDC species specific recommendations e.g. buffers, general comments (where relevant) (BioNet, 2024)	Habitat condition
												boundaries should have a 100m radius buffer around an accurate GPS point location centred on the cave/feature entrance.	
Masked Owl	<i>Tyto novaehollandiae</i>	V	-	22/07/2024	Brea Heidke Julian Carson	Call playback	Species credit 2.00	No	1	Present – lives in dry eucalypt forests and woodlands from sea level to 1100m. A forest owl, but often hunts along the edges of forests, including roadsides. Pairs have a large home-range of 1000 hectares or more, depending on prey availability. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting. Uses large tree hollows for nesting (>20 cm diameter that occurs >4 metres above the ground).	2.97 ha	Masked Owls will use patches of habitat within fragmented areas especially as foraging habitat but also for roosting and occasionally nesting. Hollows in dead stags are commonly selected for roosting and nesting habitat and are a limited resource due to natural attrition. Hollows in live trees are also used, and the prey of owls are often hollow-dependent. Masked Owls may be found nesting in paddock trees and caves. Masked Owls need large home ranges to provide adequate prey resources, with 2000 hectares being a reasonable estimated standard to expect in many habitats occupied by the species. Care must be taken to avoid disturbing nesting pairs. The species polygon must be drawn to include all vegetation zones; 1. within 800 m (being the approximate home range) from the location of a detected owl, and 2. containing a living or dead tree with a hollow >20cm diameter that occurs >4m above the ground.	Good
Small-flowered Grevillea	<i>Grevillea parviflora subsp. parviflora</i>	V	V	11/10/2022 12/10/2022	Julian Carson Mel Thurtell	5 m flora transect	Species credit 2.00	No	22	Present - Grows in sandy or light clay soils usually over thin shales, often with lateritic ironstone gravels and nodules. Occurs in a range of vegetation types from heath and shrubby woodland to open forest.	2.97 ha	Ensure that this species is considered in all planning matters on land that contains or may contain populations.	Good
Yellow-bellied Sheathtail-bat	<i>Saccolaimus flaviventris</i>	V	-	13-17/02/2023, 11-15/12/2023	Wingbeat Ecology	Anabat	Ecosystem credit	No	2 passes	Present - Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.	2.97 ha	The likely response to likely management prescriptions varies from fairly predictable to highly uncertain. For example, limiting visitation to breeding sites may lower the risk to roosting aggregations from human carried pathogens but not for a pathogen that is transmitted between bats from roost to roost. Roost requirements poorly known, paddock trees should be flagged as potential roosts. Additionally, selected <1 for have number of offspring because females do not give birth every year (often miscarry etc).	Good

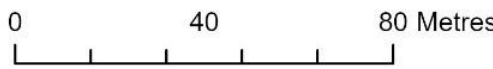
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**Figure 8 Threatened
Species**



- LEGEND**
- Identified Threatend Flora**
- Grevilla parviflora
 - Tetratheca juncea
- Identified Threatened Fauna**
- Masked Owl
 - South-easten Glossy Black-cockatoo
 - Eastern Coastal Free-tailed Bat, Little Bentwing Bat, Large Bentwing Bat, Yellow-bellied Sheathtail Bat
 - Hollow bearing Tree (HBT)
 - Modification Disturbance Area



Scale:	1:1,600
Datum:	WGS 1984
Version:	F - A3
Date:	24/01/2025
Author:	BH
Reference:	ER092

5. Avoid and minimise impacts

Centennial will adopt a hierarchy of management principles during the Project, taking into consideration environmental and engineering constraints. These management principles are:

- **Avoidance** – Avoid direct and indirect risk of adverse impacts to threatened species and their habitats where feasible.
- **Minimise** – Minimise the risk of adverse impacts to threatened species and their habitats where they cannot be avoided.
- **Mitigate** – Implement mitigation and displacement measures to manage the risk of adverse direct, indirect and cumulative impacts to threatened species and their habitats.
- **Rehabilitation** – Areas no longer required for operations will be rehabilitated.
- **Provide Offsets** – Where required, offsets will be provided in accordance with the BOS under the BC Act.

5.1 Project location and design

The initial Project footprint incorporated a larger area of impact (~3.2 ha) and involved impacts to an additional PCT that contained an ephemeral drainage line that provides potential habitat for additional threatened species such as amphibians. The change in design to avoid this area has resulted in a positive outcome for this habitat type and the potentially occurring threatened species therein. The proposed location for the Project is an incremental increase in the existing disturbed area currently used for stockpiling coal and will allow for use of the existing coal loading infrastructure and road network.

5.2 Recommendations for mitigation

Some impacts could not be avoided or minimised by the Project design and must be mitigated instead. These include standard construction impacts and those specific to the Project. These are outlined in **Table 8**.

TABLE 8 - IMPACT MITIGATION MEASURES

Mitigation measure	Method/technique	Timing	Frequency	Responsibility
Speed limits	Speed limits maintained and enforced for Project traffic.	Construction, post-construction	N/A	Construction contractor
Weed management	The Arrive Clean, Leave Clean guidelines should be adhered to.	Construction	As required	Construction contractor
Pathogen risk management	During the clearing activities and the construction of the Proposed Development, plant and machinery will be cleaned of any foreign soil and propagative material prior to being transported to the	Construction	As required	Construction contractor



Mitigation measure	Method/technique	Timing	Frequency	Responsibility
	construction areas to prevent the spread of weeds.			
Weed management	Weed management procedures will be implemented to prevent the spread of weeds both inside and outside the site.	Construction, post-construction	As required	Construction contractor
	Ongoing weed monitoring is to be implemented, and potential weed infestations appropriately managed to minimise the spread of weeds.	Construction, post-construction	As required	Construction contractor
Worker induction and training	If machinery is transported from an area of confirmed infection of Phytophthora or Chytrid fungus to the construction areas, stringent wash down will be completed before leaving the area, removing all soil and vegetative material from cabins, trays, and under carriages.	Construction	As required	Construction contractor
Delineation of disturbance areas	During construction, the Modification Disturbance Area will be delineated to ensure clearing is not undertaken outside of these areas.	Construction	As required	Construction contractor
Construction and work hour limits	Hours of construction would be restricted to reduce overall noise, dust, light spill etc.	Construction	N/A	Construction contractor
Erosion and sediment control	Erosion and sediment control will be implemented and maintained during Project construction and operation	Construction	As required	Construction contractor

5.3 Unavoidable direct and indirect impacts

Despite the avoidance and mitigation measures considered and recommended, some residual impacts will occur. Approximately 2.97 ha of native vegetation will be disturbed, which has been identified as



PCT 3583. The direct and indirect impacts of the Project are summarised along with proposed mitigation measures in **Table 9**.

The impacts considered in this assessment represent the maximum extent likely to be affected under the Project. The areas of native vegetation and threatened species habitat to be impacted and offset is presented in **Figure 9** to **Figure 15**. – **Figure** A species polygon was constructed for each threatened species detected during surveys undertaken or assumed present, with reference to the advice in their TBDC records (see **Table 6** and **Table 7** for this information).

TABLE 9 - DIRECT AND INDIRECT IMPACTS

Direct impact (Describe the impact on PCT/TEC/EC or threatened species and their habitat)	BC Act status	EPBC Act status	SAIL entity	Project phase/timing of impact (e.g., construction, operation, rehabilitation)	Extent (ha, number of individuals)
<i>Calyptrorhynchus lathami lathami</i> (Glossy Black-Cockatoo)	V	V	No	Construction & operation	2.97 ha
<i>Grevillea parviflora subsp. parviflora</i> (Small-flowered Grevillea)	V	V	No	Construction	2.97 ha
<i>Tetradlea juncea</i> (Black-eyed Susan)	V	V	No	Construction	2.97 ha
<i>Tyto novaehollandiae</i> (Masked Owl)	V	-	No	Construction & operation	2.97 ha
<i>Lathamus discolor</i> (Swift Parrot)	E	CE	Yes	Construction & operation	1.1 ha

Key: V = Vulnerable, E= Endangered, CE = Critically Endangered

5.4 SAILs

An impact is to be regarded as SAIL if it is likely to contribute significantly to the risk of a threatened species or an ecological community becoming extinct based on the following four (4) principles set out in clause 6.7 of the BC Regulation:

1. The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline.
2. The impact will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size.
3. The impact is made on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution.
4. The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity and therefore its members are not replaceable.

Field surveys identified two (2) SAIL species and one (1) additional SAIL species has been assumed present based on mapped important habitat (see **Table 10**) These SAIL species were assessed against

their habitat preferences and SAI thresholds (where available). Potential impacts to these species are required to be avoided and minimised.

TABLE 10 - SAI SPECIES IDENTIFIED

Scientific name	Common Name	Principle 1	Principle 2	Principle 3	Principle 4
<i>Miniopterus australis</i>	Little Bent-winged Bat	-	-	-	4
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	-	-	-	4
<i>Lathamus discolor</i>	Swift Parrot	1	-	-	-

Habitat descriptions below have been sourced from BioNet (DCCEW, 2024) for each SAI species.

1.1.1 Bat Species

Little Bent-winged Bat (*Miniopterus australis*)

- Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas.
- Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.
- They often share roosting sites with the Common Bentwing-bat, and, in winter, the two species may form mixed clusters.
- In NSW the largest maternity colony is in close association with a large maternity colony of Eastern Bentwing-bats (*Miniopterus schreibersii*) and appears to depend on the large colony to provide the high temperatures needed to rear its young.
- Maternity colonies form in spring and birthing occurs in early summer. Males and juveniles disperse in summer.
- Only five nursery sites /maternity colonies are known in Australia.

Large Bent-winged Bat (*Miniopterus orianae oceanensis*):

- Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.
- Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young.
- Maternity caves have very specific temperature and humidity regimes.
- At other times of the year, populations disperse within about 300 km range of maternity caves.
- Cold caves are used for hibernation in southern Australia.
- Breeding or roosting colonies can number from 100 to 150,000 individuals.
- Hunt in forested areas, catching moths and other flying insects above the treetops.

After extensive field surveys, it can be confirmed that there are no caves present within the Modification Disturbance Area and hence, the individuals detected are most likely to have been recorded in foraging habitat, not breeding habitat. Consequently, because these are both dual credit species and their species credit habitat constraints are not present, they are only retained as predicted

ecosystem credit species. These two SAI species are not currently listed under the EPBC Act and therefore, an assessment of significance is not required.

1.1.2 Swift Parrot (*Lathamus discolor*)

The Swift Parrot (*Lathamus discolor*) breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south-west slopes.

The species is a dual credit species, assessed for species credits (important habitat map) and ecosystem credits (all other areas the species is likely to occur). No survey is required if the Modification Disturbance Area is on an important habitat map for a species unless the species profile in the TBDC states otherwise.

The Swift Parrot (*Lathamus discolor*) has been considered further against the relevant SAI criteria which is rapid decline (Principle 1). Although the species is in rapid decline, the small area of proposed foraging habitat loss on the peripheries of the mapped important habitat (only ~1.1 ha is mapped within the ~2.97 ha site) is unlikely to cause a decline of the species in the locality.

This SAI species is also listed as Critically Endangered under the EPBC Act and therefore, an assessment of significance has been conducted. This assessment resulted the Project being identified as having the potential for a significant impact to the species.

5.5 Impacts to vegetation integrity

This assessment assumes the complete removal of all vegetation within the Modification Disturbance Area, represented by the reduction of all VI components and scores to 0 (**Table 12**).

5.6 Loss of hollow bearing trees

There are numerous hollow bearing trees (HBTs) within in the Modification Disturbance Area. These are located within all native vegetation zones. A total of 29 individual HBTs were mapped within the Modification Disturbance Area, with some containing multiple hollows.

Of the 29 HBTs with medium to large size hollows, only four were deemed to be potential roosting and nest trees for Masked Owls (i.e., having at least one hollow greater than 20 cm diameter, at least 4m above ground level).

Hollows suitable for Glossy-black Cockatoo habitat were observed (i.e. at least 8 m above the ground; and (ii) in stems with a diameter of at least 30 cm; and (iii) hollow diameter is at least 15 cm; and (iv) stem angle is at least 45 degrees and may be near-vertical or vertical.). Five cameras were deployed to monitor for the Glossy-black Cockatoo during breeding season (August 2024) for a period of ten days. Although no individuals were detected on the camera traps and no actual nest trees were observed, the precautionary principle has been adopted until consultation with the determining authority can confirm the preferred approach, given that the presence of suitably sized and shaped HBTs.

The Squirrel Glider relies on large old trees with hollows for breeding and nesting. Approximately 27 trees within the Modification Disturbance Area provided suitable breeding hollows for the Squirrel Glider.

TABLE 11 - HBTs WITHIN THE MODIFICATION DISTURBANCE AREA

Hollow-bearing Trees	Number of HBTs
Small hollows (≤ 5 cm)	2
Medium hollows (5-20 cm)	21
Large hollows (20 - 30 cm)	3
Extra-large hollows (>30 cm)	3
Total number of individual HBTs	29

5.7 Prescribed impacts

Prescribed impacts are impacts on threatened species which are not accounted for during assessment of native vegetation disturbance impacts within the BAM-C. They include impacts to features listed in **Table 12**.

TABLE 12 – PRESCRIBED IMPACTS

Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature. Where relevant, threatened species or fauna that are part of a TEC or EC, that are at risk of vehicle strike
Karst, caves, crevices, cliffs, rocks or other geological features of significance	No	-	-
Human-made structures	No	-	-
Non-native vegetation	No	-	-
Habitat connectivity	Yes	The Project is unlikely to introduce any impermeable linear barriers to fauna movement within the Modification Disturbance Area and the incremental increase in stockpile area may provide a minor increase to an existing barrier for movement for some smaller fauna species, thus reducing habitat connectivity.	Some smaller, less mobile fauna species may experience some minor increase in habitat fragmentation as a result of the Project.
Waterbodies, water quality and hydrological processes	No	-	-
Wind turbine strikes (wind farm development only)	No	-	-
Vehicle strikes	Yes	Vehicle movements on and around the Modification Disturbance Area will	All terrestrial and arboreal species are at an increased risk.



Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature. Where relevant, threatened species or fauna that are part of a TEC or EC, that are at risk of vehicle strike
		increase because of increased traffic during construction of the Project.	

5.8 Residual indirect impacts

Despite the implementation of appropriate mitigation measures, indirect impacts will be unavoidable under the Project. These impacts are primarily related to the construction and operation phase and are listed in **Table 13**. These indirect impacts include soil and water contamination, barriers to fauna movement, and the generation of excessive dust, light, and noise.



5.9 Residual indirect impacts

TABLE 13 - RESIDUAL INDIRECT IMPACTS

Indirect impact (Describe impact, e.g., transport of weeds and pathogens from the site to adjacent vegetation)	Impacted entities (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	Duration (long-term/ short-term/ medium-term)	Project phase/ timing of impact (e.g., construction, operation, rehabilitation)	Likelihood and consequences
Reduced viability of adjacent habitat because of edge effects	All vegetation, all fauna, including species listed in Table 10 .	Long-term	Construction and operation	Some loss of viability is almost certain. The effects would be local and limited to a marginal proportion of habitat within the Modification Disturbance Area and surrounding landscape.
Reduced viability of adjacent habitat because of noise, dust and light spill from construction areas	All fauna, including species listed in Table 10 .	Short-term	Construction	Likely but limited to areas adjacent to construction activity. Consequences dependent on intensity and duration of activity. Fauna may avoid affected habitat or be less successful there. The area affected is unlikely to be a significant proportion of the distribution of most species.
Introduction of invasive flora species to the subject land	All vegetation, all fauna, including species listed in Table 10 .	Long-term	Construction and operation	Likely. May result in the establishment of new invasive flora species and degradation of native vegetation, although infestations would be relatively easy to identify and control during the construction and operational phase.
Introduction of waste (rubbish, fuels and lubricants, materials) into surrounding ecosystems	All vegetation, all fauna, including species listed in Table 10 .	Long-term	Construction and operation	Possible, if effective materials storage and waste management systems are not implemented. Consequences may include harm to fauna through ingestion or exposure to rubbish, contamination of soil and waterways etc.
Increased risk of starvation, exposure and loss of shade or shelter	All fauna, including species listed in Table 10 .	Long-term	Construction and operation	Likely to occur, but the impact on most species is likely to be marginal given the abundance of similar habitat in the surrounding landscape. Less mobile species with smaller





Indirect impact (Describe impact, e.g., transport of weeds and pathogens from the site to adjacent vegetation)	Impacted entities (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	Duration (long-term/ short-term/ medium-term)	Project phase/ timing of impact (e.g., construction, operation, rehabilitation)	Likelihood and consequences
				ranges may experience greater local competition for these resources.
Loss of breeding habitats (Stick nests & HBTs)	All fauna, including species listed in Table 10.	Long-term	Construction and operation	Certain to occur for many species, although impact on hollow-dependent species is directly proportional to the number of hollows removed.
Hydrological changes	All vegetation	Long-term	Construction and operation	Possible. Likely to be limited to the area of direct impacts. The modified stockpile footprint and clean water diversions will affect local flows of runoff. Effects on groundwater are uncertain. The viability and health of affected vegetation may be impacted if appropriate erosion and sediment controls are not implemented and maintained.
Increase in predatory species populations	All fauna, including species listed in Table 10.	Long-term	Construction and operation	Possible, although the Project does not include any activities likely to directly promote predator population growth. The presence of waste and disturbance may attract feral predators.
Increase in pest animal populations	All fauna, including species listed in Table 10.	Long-term	Construction and operation	Possible, although the Project does not include any activities likely to directly promote pest population growth. Some species may benefit from disturbance caused by Project activities, resulting in increased competition in the landscape surrounding the Modification Disturbance Area.
Fertiliser or herbicide drift	All vegetation	Short-term	Construction	Possible. Herbicide drift could kill or sicken native vegetation in areas adjacent to treated sites. Best practice herbicide application minimises the risk of drift by avoiding spraying when drift is likely to cause harm.





6. Impact summary

6.1 Impacts on native vegetation and Threatened Ecological Communities

The total area of PCT 3583 to be cleared is approximately 2.97 ha. This PCT is not considered to form part of any BC Act or EPBC Act listed EECs.

As the Project will involve the complete removal of all vegetation within the Modification Disturbance Area, changes to the vegetation integrity are represented by the reduction of all VI components and scores to 0 (**Table 15**).

TABLE 14 - CHANGES TO VEGETATION INTEGRITY

Vegetation zone	PCT ID	Mgt zone	Area (ha)	Before development				After development				Change in VI score	
				Comp.	Struc.	Func.	VI Score	Comp.	Struc.	Func.	VI Score		
3583_High	3583	1	2.97	38.6	72.1		98.1	64.9	0	0	0	0	-64.9

6.2 Impacts on threatened species

The surveys detected two (2) threatened flora and six (6) threatened fauna (**Table 6**). Of the species detected, two (2) of the fauna species are listed SAI species. However, these were dual credit species and their habitat constraint for species credits (breeding habitat) has not been identified in the Modification Disturbance Area and they were retained as ecosystem credit/predicted species only. Similarly, two (2) more of the detected fauna were ecosystem credit species that were retained as predicted threatened species.

Of the above-mentioned species, six (6) dual or species credit species were assumed present or were recorded incidentally during surveys as follows:

- *Petaurus norfolcensis* (Squirrel Glider) (species credit species) – assumed present based on local records and secondary observations.
- *Calyptorhynchus lathami lathami* (Glossy Black-Cockatoo) (dual credit and SAI species) – actual nesting trees not recorded but included precautionarily for both ecosystem and species credits.
- *Tyto novaehollandiae* (Masked Owl) (species credit species) – recorded on site.
- *Lathamus discolor* (Swift Parrot) (dual credit and SAI species) - assumed present based on the important habitat map.
- *Grevillea parviflora subsp. parviflora* (Small-flowered Grevillea) (species credit species) – recorded on site.





- *Tetradlea juncea* (Black-eyed Susan) (species credit species) – recorded on site.

The above listed species have been considered likely to be impacted as part of the Project and species credit liabilities have been calculated for them accordingly. Of these species, the Swift Parrot (*Lathamus discolor*) is listed as an SAI species, and it has been considered further against the relevant SAI criteria (refer to **Section 5.4**). This assessment concluded that although the species is in rapid decline the small area of proposed foraging habitat loss on the peripheries of the mapped important habitat (only ~1.1 ha is mapped within the ~2.97 ha site) is unlikely to cause a decline of the species in the locality.

The Swift Parrot (*Lathamus discolor*) is also listed as Critically Endangered under the EPBC Act and therefore, an assessment of significance has been conducted accordingly. This assessment resulted in a potential for a significant impact to the species as part of the project.

6.3 Biodiversity credit report and offsets

The Project would require an offset of **84** ecosystem biodiversity credits if clearing to the maximum extent considered in this assessment occurred (**Table 16**). A combined total of **534** Species credit species are made up of **384** species credits and **150** dual credit species credits, if the potential breeding habitat is cleared (precautionarily including potential nest trees for Glossy Black Cockatoos) (**Tables 17 - 18, Figures 9 - 15**)

Under the like-for-like offsetting rules, the ecosystem credits used to offset development impacts to native vegetation that is not part of a TEC may be from the same PCT or different PCTs within the same vegetation class and in the same or higher offset trading group. These ecosystem credits must be from within the same IBRA subregion, adjacent subregions or subregions within 100 km of the Modification Disturbance Area. Species credits may not be substituted in this way and can only be offset with credits from the species that have been impacted.

TABLE 15 - IMPACTS THAT REQUIRE AN OFFSET – ECOSYSTEM CREDITS

Common name	Scientific name	BC Act status	EPBC Act status	Impact area (ha)	Current VI score	Future VI score	Change in VI score	Biodiversity risk weighting	Number of ecosystem credits required
PCT 3583	<i>Hunter Coast Lowland Scribbly Gum Forest</i>	-	-	2.97	64.9	0	-64.9	Ecosystem credit	84
Total									84





TABLE 16 - IMPACTS THAT REQUIRE AN OFFSET – SPECIES CREDITS

Common name	Scientific name	BC Act status	EPBC Act status	Loss of habitat (ha) or individuals	Biodiversity risk weighting	Number of species credits required
Black-eyed Susan	<i>Tetradlea juncea</i>	V	V	2.97 ha	Species credit 2.00	96
Masked Owl	<i>Tyto novaehollandiae</i>	V	-	2.97 ha	Species credit 2.00	96
Small-flower Grevillea	<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	V	V	2.97 ha	Species credit 2.00	96
Squirrel glider	<i>Petaurus norfolcensis</i>	V	-	2.97 ha	Species credit 2.00	96
Total						384

TABLE 17 - IMPACTS THAT REQUIRE AN OFFSET – DUAL CREDIT SPECIES

Common name	Scientific name	BC Act status	EPBC Act status	Loss of habitat (ha) or individuals	Biodiversity risk weighting	Number of species credits required
South-eastern Glossy Black-Cockatoo	<i>Calyptorhynchus lathami lathami</i>	V	V	2.97 ha	Dual credit species 2.00	96
Swift Parrot	<i>Lathamus discolor</i>	CE	CE	1.1 ha	Dual credit species 3.00	54
Total						150





TABLE 18 - ECOSYSTEM CREDIT CLASS AND MATCHING CREDIT PROFILE.

Ecosystem credit	Attributes shared with matching credits						
	PCT name	PCT vegetation class	PCT vegetation formation	Associated TEC or EC	Offset trading group (BAM Section 10.2, Tables 4 & 5)	HBTs present?	IBRA subregion (in which proposal is located)
3583	Hunter Coast Lowland Scribbly Gum Forest	Sydney Coastal Dry Sclerophyll Forests This includes PCT's: 3583, 3592, 3594	Dry Sclerophyll Forests (Shrubby sub-formation)	Not a TEC	Sydney Coastal Dry Sclerophyll Forests >=50% and <70%	Yes	Wyong



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Figure 9 Species
Polygon for
Tetratheca juncea
(Black-eyed Susan)

LEGEND

Identified Threatened Flora

Species name

- Tetratheca juncea

Plant Community Type

- PCT 3583 (High)

Species Polygon

- Tetratheca juncea
- Modification Disturbance Area



Scale:	1:1,600
Datum:	WGS 1984
Version:	E - A3
Date:	25/11/2024
Author:	BH
Reference:	ER092

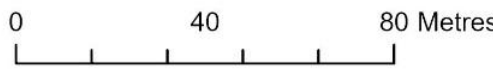
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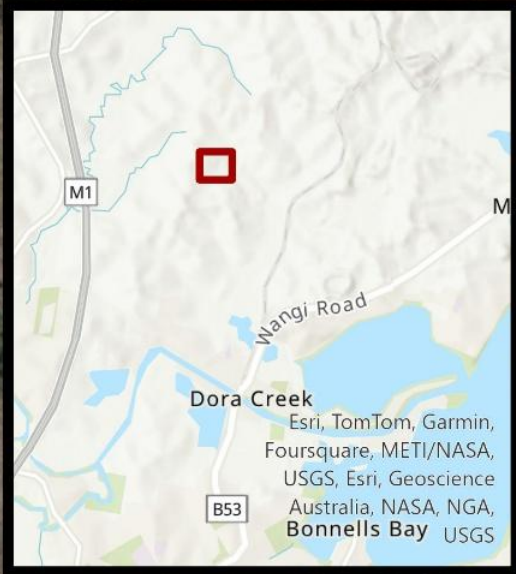
Figure 10
Species Polygon for
Squirrel Glider

(Petaurus norfolcensis)

- LEGEND**
-  Modification Disturbance Area
 - Incidental observation**
 -  Glider chew marks
 - Hollow-bearing Tree**
 -  HBT
 - Plant Community Type**
 -  PCT 3583 (High)
 - SG Species Polygon**
 -  Squirrel Glider/Yellow-bellied Glider



Scale:	1:1,600
Datum:	WGS 1984
Version:	F - A3
Date:	25/11/2024
Author:	BH
Reference:	ER092



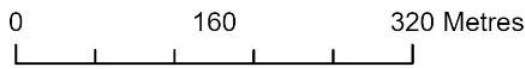
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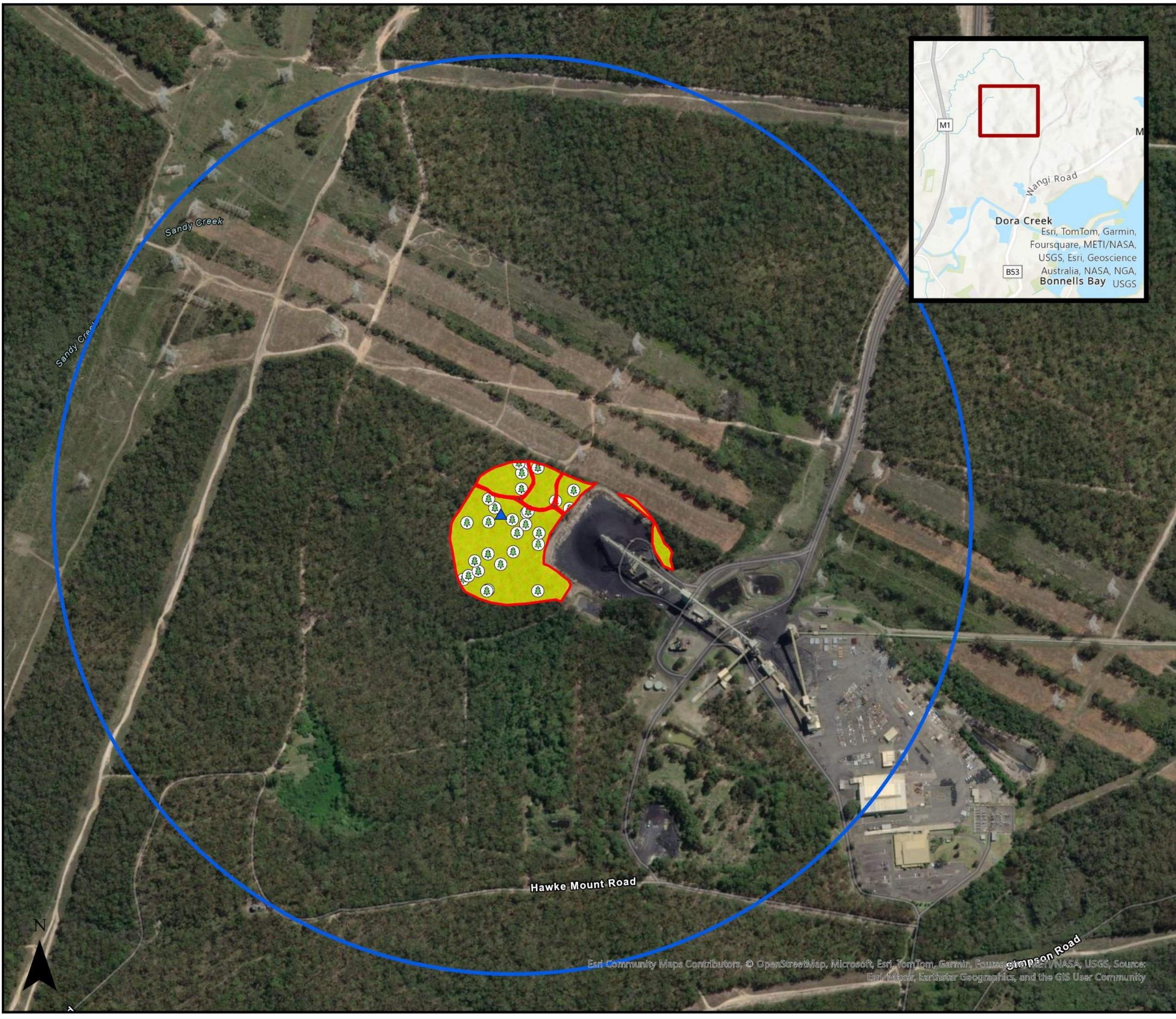
Figure 11
Species Polygon for
Masked Owl

(Tyto novaehollandiae)

- LEGEND**
- Modification Disturbance Area
 - Identified Threatened Species**
 - Masked Owl
 - Masked Owl Homerange**
 - 800m buffer
 - Hollow-bearing Tree**
 - HBT
 - Plant Community Type**
 - PCT 3583 (High)
 - Species Polygon**
 - Masked owl



Scale:	1:1,600
Datum:	WGS 1984
Version:	E - A3
Date:	25/11/2024
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Figure 12
Species Polygon for
South-eastern Glossy
Black-cockatoo

(Calyptorhynchus lathami)

LEGEND

Identified Threatened Fauna

▲ South-eastern Glossy Black-cockatoo

Species polygon

■ South-eastern Glossy Black-cockatoo

Plant Community Type

▨ PCT 3583 (High)

□ Modification disturbance Boundary

0 40 80 Metres

Scale:	1:1,600
Datum:	WGS 1984
Version:	E - A3
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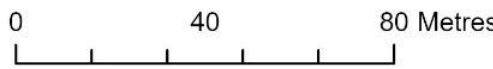
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**Figure 13 Species
Polygon for Swift
Parrot**

(Lathamus discolor)



- LEGEND**
- Species Polygon**
- Swift Parrot
- Plant Community Type**
- PCT 3583 (High)
 - Modification Disturbance Area



Scale:	1:1,600
Datum:	WGS 1984
Version:	C - A3
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Figure 14 Species
Polygon for *Grevillea
parviflora* subsp.
parviflora

(*Grevillea parviflora* subsp.
parviflora)

LEGEND

Identified Threatened Flora

Species name

● *Grevilla parviflora*

Plant Community Type

▨ PCT 3583 (High)

Species Polygon

▨ *Grevillea parviflora* subsp.
parviflora

▨ Modification Disturbance Area

0 40 80 Metres

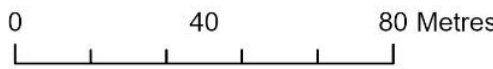
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Date:	21/08/2024
Author:	BH
Reference:	ER092

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**Figure 15
Areas to be Offset**

- LEGEND**
- Offset required**
- Offset Area (2.97 ha)
 - Modification Disturbance Area



Scale:	1:1,600
Datum:	WGS 1984
Version:	C - A3
Date:	25/11/2024
Author:	BH
Reference:	ER092

6.4 Limitations

The limitations and assumptions applying to this assessment include:

- All calculations of direct impacts assume clearing of vegetation to the maximum extent of the proposed Modification Disturbance Area indicated in **Figure 1**.
- The likelihood of indirect and prescribed impacts can generally be estimated with reasonable accuracy, however, their magnitude and consequences for any individual species or ecosystem can rarely be reliably quantified, even where specialist information (e.g., noise assessments, hydrological studies) is available for the potential impacts.

7. Conclusion

Approximately 2.97 ha of native vegetation belonging to PCT 3583, *Hunter Coast Lowland Scribbly Gum Forest*, was identified as being potentially impacted by the Project. None of this vegetation forms part of a TEC.

The surveys detected two (2) threatened flora and six (6) threatened fauna. Of the species detected, two (2) of the Fauna species are listed SAI species, however, these were dual credit species and their habitat constraint for species credits (breeding habitat) has not been identified in the Project site and they were retained as ecosystem credit/predicted species only. Similarly, two (2) more of the detected fauna were ecosystem credit species that were retained as predicted threatened species.

Of the above-mentioned species, six (6) dual credit or species credit species were assumed present or were recorded incidentally during surveys as follows:

- *Petaurus norfolcensis* (Squirrel Glider) (species credit species) – assumed present based on local records and secondary observations.
- *Calyptorhynchus lathami lathami* (Glossy Black-Cockatoo) (dual credit species and SAI species) – actual nesting trees not recorded but included precautionarily for both ecosystem and species credits.
- *Tyto novaehollandiae* (Masked Owl) (species credit species) – recorded on site.
- *Lathamus discolor* (Swift Parrot) (dual credit and SAI species) - assumed present based on the important habitat map.
- *Grevillea parviflora subsp. parviflora* (Small-flowered Grevillea) (species credit species) – recorded on site.
- *Tetratheca juncea* (Black-eyed Susan) (species credit species) – recorded on site.

The above listed species have been considered likely to be impacted as part of the project and species credit liabilities have been calculated for them accordingly. Of these species, the Swift Parrot (*Lathamus discolor*) is listed as an SAI species, and it has been considered further against the relevant SAI criteria. This assessment concluded that although the species is in rapid decline the small area of proposed foraging habitat loss on the peripheries of the mapped important habitat is unlikely to cause a decline of the species in the locality.



The Swift Parrot (*Lathamus discolor*) is also listed as Critically Endangered under the EPBC Act and therefore, an assessment of significance has been conducted accordingly. This assessment resulted in a potential for a significant impact to the species.

The Project would require an offset of **84** ecosystem biodiversity credits if clearing to the maximum extent considered in this assessment occurred. A combined total of **534** Species credit species are made up of **384** species credits and **150** dual credit species credits, if the potential breeding habitat (including actual nest trees for Glossy Black Cockatoos) identified in this assessment is cleared.

8. References

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- NSW Office of Environment and Heritage [OEH] (2024). Threatened biodiversity profile search. Available at: <https://www.environment.nsw.gov.au/threatenedspeciesapp/>. Accessed July 2024.

Appendix A – S-BDAR content requirements compliance checklist – Small area

S-BDAR section	BAM ref.	BAM requirement	Section in the S-BDAR
Introduction	Chapters 2 and 3	INFORMATION	
		Introduction to the biodiversity assessment including:	
		☐ brief description of the proposal	1.2 1.4
		☐ identification of subject land boundary, including:	1.3
		☐ operational footprint	Figure 1 & 2
		☐ construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure	
		☐ general description of the subject land	1.2 1.3 2.0 Figure 1 & 2
		☐ sources of information used in the assessment, including reports and spatial data	1.6
		☐ Identification of assessment method applied (i.e. linear or site-based)	1.5
		MAPS AND TABLES	
		☐ Map of the subject land boundary showing the final proposal footprint, including the construction footprint for any clearing associated with temporary/ancillary construction facilities and infrastructure	Figures 1 & 2
Landscape	Sections 3.1 and 3.2, Appendix E	INFORMATION	
		Identification of site context components and landscape features, including:	
		☐ general description of subject land topographic and hydrological setting, geology and soils	Table 1, Figures 1 & 2
		☐ percent native vegetation cover in the assessment area (as described in BAM subsection 3.2(4.))	Table 2
		☐ IBRA bioregions and subregions (as described in BAM Subsection 3.1.3(2.))	Table 1 Figure 2
		☐ rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3(3-4.) and Appendix E)	Table 1
		☐ wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3(4.))	Table 1
		☐ connectivity of different areas of habitat (as described in BAM Subsection 3.1.3(5–6.))	Table 1

S-BDAR section	BAM ref.	BAM requirement	Section in the S-BDAR
		☐ areas of geological significance and soil hazard features (as described in BAM Subsections 3.1.3(7.) and 3.1.3(10.).	NA (could not find in report – should it be added?)
		☐ areas of outstanding biodiversity value occurring on the subject land and assessment area (as described in BAM Subsection 3.1.3(8–9.))	Table 1
		MAPS AND TABLES	
		Site Map:	Figure 1
		☐ boundary of subject land	
		☐ cadastre of subject land	
		☐ landscape features identified in BAM Subsection 3.1.3	
		☐ areas of outstanding biodiversity value within the subject land	
		Location Map:	Figures 1 & 2
		☐ digital aerial photography at 1:1,000 scale or finer	
		☐ boundary of subject land	
		☐ Assessment area (i.e. the subject land and either 1500 m buffer area or 500 m buffer for linear development)	
		☐ landscape features identified in BAM Subsection 3.1.3	
		☐ additional detail (e.g. local government area boundaries) relevant at this scale	
		☐ areas of outstanding biodiversity value within the assessment area	
		Landscape features identified in BAM Subsection 3.1.3 and to be shown on the Site Map and/or Location Map include:	
		☐ IBRA bioregions and subregions	Figure 2
		☐ rivers, streams and estuaries	
		☐ wetlands and important wetlands	
		☐ connectivity of different areas of habitat	
		☐ areas of geological significance and soil hazard features	
		DATA	
		☐ All report maps as separate jpeg files	Yes, attached separately
		Individual digital shape files of:	Yes, attached separately
		☐ subject land boundary	Yes, attached separately

S-BDAR section	BAM ref.	BAM requirement	Section in the S-BDAR
		☐ assessment area (i.e. buffer area) boundary	Yes, attached separately
		☐ cadastral boundary of subject land	Yes, attached separately
		☐ areas of native vegetation cover	Yes, attached separately
		☐ areas of habitat connectivity	Yes, attached separately
Native vegetation, TECs and vegetation integrity	Chapter 4	INFORMATION	
		☐ Patch size (in accordance with BAM Subsection 4.3.2)	3.3
		☐ Identification of the dominant PCT on the subject land and extent (ha) with justification of method used (existing information or plot-based survey data)	3.2 Table 2 Figure 5, Appendix C
		☐ Identification of any TECs associated with the PCT (BAM Subsection 4.2.2)	N/A
		☐ Estimate of percent cleared value of dominant PCT (BAM Subsection 4.2.1(5.))	Table 3
		☐ Identification of any TEC on site that is not associated with the dominant PCT (Note: This TEC is required to best assessed and offset.)	NA
		☐ Equivalence with mapping units of previous vegetation maps reviewed as part of the assessment (i.e. equivalent mapping units)	Figure 5
		☐ Vegetation integrity of the PCT(s) on the subject land as individual vegetation zones	3.4 Table 3
		☐ Justification for how this was determined (i.e. qualitatively by observing values for the condition attributes set out in Table 2 of the BAM, or quantitatively by collecting field data for the condition attributes at a plot in accordance with BAM Subsection 4.3.4)	3.4 Table 3
		Use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsections 4.4.4(5.)). Where use of more appropriate local benchmark data is proposed (as described in BAM Subsection 1.4.2, 4.3.3(5.) and BAM Appendix A):	
		☐ identify the PCT or vegetation class for which local benchmark data will be applied	N/A
		☐ identify published sources of local benchmark data (if benchmarks obtained from published sources)	N/A
		☐ describe methods of local benchmark data collection (if reference plots used to determine local benchmark data)	N/A
		☐ provide justification for use of local data rather than BioNet Vegetation Classification values	N/A

S-BDAR section	BAM ref.	BAM requirement	Section in the S-BDAR
		MAPS AND TABLES	
		☐ Map of native vegetation extent within the subject land (as described in BAM Section 3.1)	Figure 3
		☐ Map of PCT/vegetation zones within the subject land (as described in BAM Section 4.2(1.))	Figure 3
		☐ Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCT boundaries	Figure 3
		☐ Map of TEC distribution on the subject land and table of TEC listing, status and area (ha)	N/A
		☐ Map of patch size locations for each native vegetation zone and table of patch size areas (as described in BAM Subsection 4.3.2)	N/A
		Table of current vegetation integrity scores for each vegetation zone within the site and including:	
		☐ composition condition score	Table 3
		☐ structure condition score	
		☐ function condition score	
		☐ Report from BAM-C (small area module) including vegetation integrity scores (BAM Section 4.4)	Appendix E
		DATA	
		☐ All report maps as separate jpeg files	Yes, attached separately
		☐ Plot field data (MS Excel format)	Appendix C
		☐ Field data sheets (if relevant) for determining vegetation integrity (BAM Subsection 4.3.4)	Appendix C
Habitat suitability for threatened species	Chapter 5 and Section 9.1	INFORMATION	
		☐ Describe the review of existing information and any field survey undertaken to assess habitat constraints and microhabitats for threatened species within the subject land	3.1 4.1 4.3 Table 5 Figures 4-8
		☐ Determination of the suite of threatened species likely to occur on or use the proposed site according to Steps 1 and 2 in BAM Section 5.2 including species to be assessed for ecosystem credits and the list of species to be assessed for species credits	4.3 Table 5 Appendix B

S-BDAR section	BAM ref.	BAM requirement	Section in the S-BDAR
		☐ list of ecosystem credit species derived from the TBDC (as described in BAM Subsection 5.2.1 and Section 5.2.2.) with justification for the exclusion of any ecosystem credit species based on habitat constraints (as described in BAM Subsection 5.2.2)	Table 6
		☐ Identification of candidate credit species that are at risk of an SAI and therefore, must be further assessed (BAM Section 9.1) Note: Candidate species credit species that are not at risk of an SAI and not incidentally recorded on the subject land do not require further assessment	4.4 Tables 6 & 10
		For candidate species credit species that are at risk of an SAI, a description of the species, any habitat constraints or microhabitats associated with the species on the subject land and information used to create the species polygon/s in accordance with Steps 3 to 5 of BAM Section 5.2 including:	
		☐ justification for determining that a candidate species credit species at risk of an SAI is unlikely to have suitable habitat on the subject land or specific vegetation zone (based on a field assessment of the subject land and published literature or an expert report prepared in accordance with Box 3 of the BAM)	5.4 Tables 6 & 10
		☐ determination of the presence of remaining candidate species credit species at risk of an SAI (by assuming presence, conducting a threatened species survey or an expert report). Note: If the subject land is mapped on an important habitat map for a species, or for a component of its habitat, the subject land is considered to have suitable habitat for the species to be present.	Tables 6 & 7
		☐ species polygons identifying the location and area of suitable habitat for each candidate threatened species at risk of an SAI that is recorded on the subject land and is measured by area, OR	N/A
		☐ species polygons identifying the area of suitable habitat and targeted surveys identifying the count and location of individuals on the subject land for each candidate threatened flora species at risk of an SAI that is recorded on the subject land and is measured by count	N/A
		☐ species polygons for each threatened species identified on the subject land that is not at risk of an SAI (i.e. incidentally observed during site visit)	Figures 9 - 13
		☐ Determination of habitat condition within species polygon/s for each threatened species (measured by area) at risk of an SAI or incidentally observed during the site visit (Step 6 of BAM Section 5.2)	Tables 6 & 7
		☐ For flora species credit species at risk of an SAI or incidentally observed during the site visit, provide a count, or an estimation, of the number of individual plants present on the subject land (as described in BAM Subsection 5.2.5(4.))	Table 6
		MAPS AND TABLES	
		☐ Table showing ecosystem credit species in accordance with BAM Subsection 5.1.1, and identifying:	
		☐ any ecosystem credit species removed from the list on the basis of further assessment in accordance with BAM Subsections 5.2.2 and 5.2.3	Table 5

S-BDAR section	BAM ref.	BAM requirement	Section in the S-BDAR
		☐ the sensitivity to gain class of each species (BAM Section 5.4)	Table 19
		☐ Table detailing species credit species within the subject land at risk of an SAI (BAM Section 9.1) or incidentally observed during the site visit including any associated habitat feature/components and its abundance (flora)/extent of habitat (flora and fauna) and biodiversity risk weighting (BAM Sections 5.2-5.4)	Table 6
		☐ Map of species credit species records within the subject land and species polygons for flora and fauna species at risk of an SAI or incidentally observed during the site visit (as described in BAM Subsection 5.2.5(1-7.))	Figure 9
		DATA	
		☐ Digital shape files of species polygon	Yes, attached separately
		☐ Species polygon map in jpeg format	Yes, attached separately
		☐ Expert reports and any supporting data used to support conclusions of the expert report	N/A
		☐ Field datasheets detailing survey information including prevailing conditions, date, time, equipment used, etc.	4.3 Appendix C Appendix D
Prescribed impacts	Chapter 6	INFORMATION	
		☐ Any prescribed impacts from the small area proposal must be set out in the BDAR consistent with Appendix K	5.7 Table 12
		MAPS AND TABLES	
		☐ If relevant, maps showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.)	NA
		DATA	
		☐ If relevant, digital shape files of prescribed impact feature locations	Yes, attached separately
		☐ Prescribed impact features map in jpeg format	Yes, attached separately
Avoid and minimise impacts	Chapter 7	INFORMATION	
		Demonstration of efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the proposal location in accordance with Chapter 7, including an analysis of alternative:	Table 8
		☐ modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology	Table 8
		☐ alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location	5.1

S-BDAR section	BAM ref.	BAM requirement	Section in the S-BDAR
		☐ alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site	5.1
		☐ Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design (as described in BAM Sections 7.1.2 and 7.2.2)	5.1 Table 8
		☐ Identification of any other site constraints that the proponent has considered in determining the location and design of the proposal (as described in BAM Subsection 7.2.1(3.))	5.1 Table 8
		MAPS AND TABLES	
		☐ Table of measures to be implemented before, during, and after construction to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility	Table 8
		☐ Map of the final proposal footprint, including construction and operation	Figure 2
		☐ Maps demonstrating indirect impact zones where applicable	Figure 2
		DATA	
		Digital shape files of:	
		☐ final proposal footprint	
		☐ direct and indirect impact zones	
		☐ Maps in jpeg format	
Assessment of impacts	Chapter 8, Sections 8.1 and 8.2	INFORMATION	
		Determine the impacts on native vegetation and threatened species habitat, including:	
		☐ a description of direct impacts of clearing of native vegetation, threatened ecological communities and threatened species habitat (as described in BAM Section 8.1)	5.5 5.6 6.1
		☐ a description of the nature, extent, frequency, duration and timing of indirect impacts of the proposal (as described in BAM Subsection 8.2)	Table 13
		☐ Any prescribed impacts from the small area proposal must be set out in the BDAR consistent with Appendix K.	Table 12
		MAPS AND TABLES	
		☐ Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts	Table 15

S-BDAR section	BAM ref.	BAM requirement	Section in the S-BDAR
Mitigation and management of impacts	Chapter 8, Sections 8.4 and 8.5	INFORMATION	
		Identification of measures to mitigate or manage impacts in accordance with the recommendations in BAM Sections 8.4 and 8.5 including:	
		☐ techniques, timing, frequency and responsibility ☐ identify measures for which there is risk of failure ☐ evaluate the risk and consequence of any residual impacts ☐ document any adaptive management strategy proposed	Tables 8 & 13
		Identification of measures for mitigating impacts related to:	
		☐ displacement of resident fauna (as described in BAM Subsection 8.4.1)) ☐ indirect impacts on native vegetation and habitat (as described in BAM Subsection 8.4.1(3.)) ☐ mitigating prescribed biodiversity impacts (as described in BAM Subsection 8.4.2)	Table 8
		☐ Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM Section 8.5)	Tables 8 & 14
		MAPS AND TABLES	
		☐ Table of measures to be implemented before, during and after construction to mitigate and manage impacts of the proposal, including action, outcome, timing and responsibility	Table 8
Thresholds for assessing and offsetting the impacts of the proposal	Chapter 9	INFORMATION	
		☐ Information from the TBDC and/or other sources to report on the current status of threatened species, threatened populations at risk of an SAI and TEC/s for the proposal and	Table 9
		☐ Report on impacts of the proposal on TEC/s in accordance with BAM Subsection 9.2.1	N/A
		☐ Report on impacts of the proposal on threatened species and/or threatened populations at risk of an SAI in accordance with BAM Section 9.1	Tables 9 & 12
		☐ Identification of impacts requiring offset in accordance with BAM Section 9.2	Tables 16 - 18
		☐ Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1(3.)	N/A
		☐ Identification of areas not requiring assessment in accordance with BAM Section 9.3	N/A

S-BDAR section	BAM ref.	BAM requirement	Section in the S-BDAR
		MAPS AND TABLES	
		☐ Map showing the extent of TECs at risk of an SAI within the subject land	N/A
		☐ Map showing location of threatened species at risk of an SAI within the subject land	N/A
		Map showing location of:	
		☐ impacts requiring offset	Figure 9-15
		☐ impacts not requiring offset	N/A
		☐ areas not requiring assessment	N/A
		DATA	
		Digital shape files of:	
		☐ extent of TECs at risk of an SAI within the subject land	N/A
		☐ location of threatened species at risk of an SAI within the subject land	N/A
		☐ boundary of impacts requiring offset	Figure 15
		☐ boundary of impacts not requiring offset	N/A
		☐ boundary of areas not requiring assessment	N/A
		☐ Maps in jpeg format	
Applying the no net loss standard	Chapter 10	INFORMATION	
		☐ Description of the impact on PCTs/TECs	6.1 Table 15
		☐ Description of the impact on the threatened species at risk of an SAI or incidentally observed via site visit	6.2 Table 13
		☐ Number of ecosystem credits required for impacts on biodiversity values according to BAM Subsection 9	1.8 Table 14
		☐ Number of species credits required for impacts on biodiversity values according to BAM Subsection 10.1.3, including any species credit species that has been incidentally observed on the subject land Note: Species credits for any species at risk of an SAI are calculated in the event that the decision-maker forms the opinion that the proposed impact is unlikely to be serious and irreversible and therefore can be offset.	1.8 Table 15
		☐ Identification of credit class for ecosystem credits and species credits according to BAM Section 10.2 (this can be generated from BAM-C)	1.8 Table 16



S-BDAR section	BAM ref.	BAM requirement	Section in the S-BDAR
		MAPS AND TABLES	
		☐ Table showing biodiversity risk weightings	Tables 16 - 18
		☐ Table of BC Act listing status for PCTs and threatened species requiring offset	6.3 Table 16
		☐ Table of PCTs requiring offset and the number of ecosystem credits required (Subsection 10.2.1)	6.3 Table 16
		☐ Table of species at risk of an SAIL or incidentally observed on site assessed for species credits and the number of species credits required	Table 17, Table 18



Appendix B – Likelihood of Occurrence (LoO) and matters requiring additional consideration

Stage 1 involved a preliminary desktop ‘likelihood of occurrence’ (LoO) assessment for threatened species identified. NSW BioNet records, habitat requirements and breeding and foraging behaviour were considered in relation to the habitat and location of the proposed action. Stage 2 involved refining the threatened species LoO assessment following field observations and further assessment of habitat constraints and the potential impact of the proposed action. The LoO classifications were assigned to each threatened species based on the criteria set out in below:

- None: Habitat features within the area of interest are unsuitable for the species e.g., aquatic species within a terrestrial environment.
- Low: The area of interest seldom contains suitable habitat for the species, no recent records (i.e., NSW BioNet records) occur within the area of interest.
- Moderate: Important habitat features occur within the area of interest for the species. The area of interest may or may not be within the species indicative ‘known or predicted mapped distribution’. Species may or may not have been detected recently within the locality i.e., within NSW BioNet records.
- High: High quality habitat features specifically associated with the species generally occur within the area of interest and is within the species known distribution. Recent NSW BioNET records have recently observed the species within the location.
- Known: The species has been identified on site by EcoResolve following field surveys.

TABLE B1- LIKELIHOOD OF OCCURRENCE ASSESSMENT TERRESTRIAL SPECIES

Scientific Name (Common Name)	BC Act	EPBC Act	Habitat	Number of Records (DPE 2024)	Likelihood of Occurrence
<i>Acacia bynoeana</i> (Bynoe's Wattle)	E	V	Grows mainly in heath and dry sclerophyll forest in sandy soils. Mainly south of Dora Creek-Morisset area to Berrima and the Illawarra region, west to the Blue Mountains, also recorded from near Kurri Kurri in the Hunter Valley and from Morton National Park.	102	Moderate.
<i>Actitis hypoleucos</i> (Common Sandpiper)	-	M, MAR	Utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats.	0	Low.
<i>Angophora inopina</i>	V	V	Endemic to the Central Coast region of NSW. The known northern limit is near Karuah where a disjunct population occurs; to the south populations extend from Toronto to Charmhaven with the main population occurring between Charmhaven and Morisset. Occurs most frequently in red bloodwood – scribbly gum woodland, wet heath, red mahogany – paperbark sedge woodland and stringybark – red bloodwood forest.	536	High.
<i>Anous stolidus</i> (Common Noddy)	-	MAR, M	During the non-breeding period, the species occurs in groups throughout the pelagic zone. During the breeding season, usually occurs on or near islands, on rocky islets and stacks with precipitous cliffs, or on shoals or cays of coral or sand. When not at the nest, individuals will remain close to the nest, foraging in the surrounding waters.	0	Low.
<i>Anthochaera Phrygia</i> (Regent Honeyeater)	CE	CE	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. The distribution of the species has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests.	1	Moderate.
<i>Apus pacificus</i> (Fork-tailed Swift)	-	M	The Fork-tailed Swift is almost exclusively aerial, flying from less than one metre to at least 300 metres above ground and probably much higher.	1	Moderate.
<i>Ardenna grisea</i> (Sooty Shearwater)	-	V, MIG, MAR	the Sooty Shearwater breeds on islands off New South Wales (NSW) and Tasmania. The species occurs off the coast of south-east Queensland in small numbers and is a moderately common migrant and visitor to Victoria and South Australia	0	Low.
<i>Ardenna tenuirostris</i> (Short-tailed Shearwater)	-	MAR, M	<i>Ardenna tenuirostris</i> is an abundant seabird species in Australian waters, which migrate to the seas off the Aleutian Islands and Kamchatka in the Australian winter. In the austral spring, they migrate down the coast of California before crossing the Pacific back to Australia.	2	Low.
<i>Arenaria interpres</i> (Ruddy Turnstone)	-	V, M	Rocky shores	0	Low.
<i>Artamus cyanopterus cyanopterus</i> (Dusky Woodswallow)	V	-	The Dusky Woodswallow is widespread in eastern, southern and southwestern Australia. In New South Wales it is widespread from coast to inland, including the western slopes of the Great Dividing Range and farther west. It is sparsely scattered in, or largely absent from, much of the Upper Western region. The Dusky Woodswallow is often reported in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests; very occasionally in moist forests or rainforests. At sites where Dusky Woodswallows are recorded the understorey is typically open with sparse eucalypt saplings, acacias and other shrubs, including heath. The ground cover may consist of grasses, sedges or open ground, often with coarse woody debris (Higgins and Peter 2002). Birds are also often observed in farm land, usually at the edges of forest or woodland or in roadside remnants or wind breaks with dead timber.	0	Moderate.

Scientific Name (Common Name)	BC Act	EPBC Act	Habitat	Number of Records (DPE 2024)	Likelihood of Occurrence
<i>Asperula asthenes</i> (Trailing Woodruff)	V	V	This small herb occurs only in NSW. It is found in scattered locations from Bulahdelah north to near Kempsey, with several records from the Port Stephens-Wallis Lakes area. Damp sites, often along river banks.	1	Moderate.
<i>Botaurus poiciloptilus</i> (Australasian Bittern)	E	E	The Australasian Bitterns is widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes and spike rushes.	0	Low.
<i>Burhinus grallarius</i> (Bush Stone-curlew)	E	-	The Bush Stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however and, in the south-east, it is either rare or extinct throughout its former range. Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber. Largely nocturnal, being especially active on moonlit nights.	0	Moderate.
<i>Caladenia tessellate</i> (Thick-lip Spider Orchid)	E	V	The Tessellated Spider Orchid is found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. Known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW. Populations in Kiama and Queanbeyan are presumed extinct.	1	Moderate
<i>Calidris acuminata</i> (Sharp-tailed Sandpiper)	-	V, M	Freshwater or saltwater wetlands- the muddy edges of lagoons, swamps, lakes, dams, soaks, sewage dams or temporary floodwaters.	0	Low.
<i>Calidris canutus</i> (Red Knot)	-	V	The Red Knot is common in all the main suitable habitats around the coast of Australia. Very large numbers are regularly recorded in north-west Australia, with 80 Mile Beach and Roebuck Bay being particular strongholds. The only places it is not found in significant numbers are the northern part of the Great Australian Bight in South Australia and Western Australia, and along much of the NSW coast, where wader habitat is rather scarce (excluding the Hunter Estuary). It is widespread along the coast south of Townsville and along the coasts of NSW and Victoria. In Australasia the Red Knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. They rarely use inland lakes or swamps.	0	Low.
<i>Calidris ferruginea</i> (Curlew Sandpiper)	E	CE, MAR, M	The Curlew Sandpiper is distributed around most of the coastline of Australia. It occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes the inland	0	Low.
<i>Calidris melanotos</i> (Pectoral Sandpiper)	-	M	Tends to live and feed over shallow coastal waters- the estuaries, lagoons and channels around river and harbour entrances and along the shallows close in shore.	0	Low.
<i>Calidris ruficollis</i> (Red-necked Stint)	-	M	Mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores. Occasionally they have been recorded on exposed or ocean beaches, and sometimes on stony or rocky shores, reefs or shoals. They also occur in saltworks and sewage farms; saltmarsh; ephemeral or permanent shallow wetlands near the coast or inland, including lagoons, lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks and pools in salt flats. They sometimes use flooded paddocks or damp grasslands. They have occasionally been recorded on dry gibber plains, with little or no perennial vegetation	0	Low.
<i>Callistemon linearifolius</i>	V	-	Recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW. Recorded in 2000 at Coalcliff in the northern Illawarra. For the Sydney area, recent records are limited to the Hornsby Plateau area near the Hawkesbury River. Grows in dry sclerophyll forest on the coast and adjacent ranges.	9	High
<i>Callocephalon fimbriatum</i> (Gang-gang Cockatoo)	V	E	In summer, occupies tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. Also occur in subalpine snow gum woodland and occasionally in temperate or regenerating forest. In winter, occurs at lower altitudes in drier, more open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas. It requires tree hollows in which to breed.	1	High.
<i>Calyptorhynchus lathami lathami</i> (Glossy Black-Cockatoo)	V	V	Inhabits forest with low nutrients, characteristically with key Allocasuarina spp. Tends to prefer drier forest types with a middle stratum of Allocasuarina below Eucalyptus or Angophora. Often confined to remnant patches in hills and gullies. Breed in hollows stumps or limbs, either living or dead. Endangered population in the Riverina.	23	Known
<i>Chalinolobus dwyeri</i> (Large-eared Pied Bat)	V	E	Located in a variety of drier habitats, including the dry sclerophyll forests and woodlands to the east and west of the Great Dividing Range. Can also be found on the edges of rainforests and in wet sclerophyll forests. This species roosts in caves and mines in groups of between 3 and 37 individuals.	1	Moderate.
<i>Charadrius leschenaultia</i> (Greater Sand-plover)	V	-	Occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons. Non-breeding in Australia.	0	Low.
<i>Charadrius veredus</i> (Oriental Plover)	-	MAR, M	Non-breeding visitor to Australia, occurring in both coastal and inland areas. Rarely recorded in the south-east, with highest occurrences in Australia being in northern and north-western Australia. Spends a few weeks in coastal habitats before heading inland to flat grassy and semi-arid to arid grasslands.	0	Low.
<i>Chthonicola sagittate</i> (Speckled Warbler)	V	-	The Speckled Warbler lives in a wide range of eucalypt dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy.	0	Low.
<i>Climacteris picumnus victoriae</i> (Brown Treecreeper (eastern subspecies))	V	V	Found in eucalypt woodlands (including box-gum woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and river red gum forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains.	1	Moderate.
<i>Corunastylis insignis</i> (Variable Midge Orchid)	CE	CE	Grows in patches of kangaroo grass amongst shrubs and sedges in heathland and forest. Associated vegetation at Chain Valley Bay is described as dry sclerophyll woodland dominated by scribbly gum, red bloodwood, smooth-barked apple and black she-oak.	0	Moderate.
<i>Corunastylis</i> sp. Charmhaven (NSW896673)	CE	CE	Corunastylis sp. Charmhaven (NSW896673) is currently only known from the Wyong Shire of NSW where it is restricted to a few locations in the Charmhaven, Warnervale and Tooheys Road (Bushells Ridge) areas. It occurs within low woodland to heathland with a shrubby understorey and ground layer. Dominants include Black She-oak (Allocasuarina littoralis), Prickly Tea-tree (Leptospermum juniperinum), Prickly-leaved Paperbark (Melaleuca nodosa), Narrow-leaved Bottlebrush (Callistemon linearis) and Zig-zag Bog-rush (Schoenus brevifolius).	0	Moderate.
<i>Corybas dowlingii</i>	E	-	Sheltered areas such as gullies and southerly slopes in tall open forest on well-drained gravelly soil at elevations of 10-200 m.	2134	High.

Scientific Name (Common Name)	BC Act	EPBC Act	Habitat	Number of Records (DPE 2024)	Likelihood of Occurrence
<i>Crinia tinnula</i> (Wallum Froglet)	V	-	Wallum Froglets is found in acid paperbark swamps and sedge swamps of the coastal 'wallum' country. Their tadpoles are adapted to acid conditions and may be outcompeted by the Common Froglet. Males call from the base of vegetation in and around the breeding site and are almost impossible to locate. Calling occurs from Autumn to Spring, being most strongly associated with flooding following rainfall. Its range extends from SE QLD to the Kurnell Peninsular of Sydney.	4	High.
<i>Cryptostylis hunteriana</i> (Leafless Tongue-orchid)	V	V	Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by Scribbly Gum (<i>Eucalyptus sclerophylla</i>), Silvertop Ash (<i>E. sieberi</i>), Red Bloodwood (<i>Corymbia gummifera</i>) and Black Sheoak (<i>Allocasuarina littoralis</i>); appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (<i>C. subulata</i>) and the Tartan Tongue Orchid (<i>C. erecta</i>).	10	High.
<i>Cuculus optatus</i> (Oriental Cuckoo, Horsefield's Cuckoo)	-	M, MAR	Occurs in a variety of environments throughout tropical and subtropical Australia extending from the Pilbara in WA to southern NSW east of the Great Dividing Range.	0	Low.
<i>Cynanchum elegans</i> (White-flowered Wax Plant)	E	E	Recorded from rainforest gullies scrub and scree slopes from the Gloucester district to the Wollongong area and inland to Mt Dangar.	0	Moderate.
<i>Daphoenositta chrysoptera</i> (Varied Sittella)	V	-	Inhabits wide variety of dry eucalypt forests and woodlands, usually with either shrubby under storey or grassy ground cover or both, in all climatic zones of Australia. Usually in areas with rough-barked trees, such as stringybarks or ironbarks, but also in paperbarks or mature Eucalypts with hollows.	4	High.
<i>Dasyurus maculatus</i> (Spotted-tailed Quoll)	V	E	Spotted-tailed Quoll are found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Queensland. Only in Tasmania is it still considered common. Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	0	Moderate.
<i>Dasyurus maculatus maculatus</i> (Spotted-tailed Quoll (SE population))	V	E	Spotted-tailed Quoll are found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Queensland. Only in Tasmania is it still considered common. Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	0	High.
<i>Diomedea antipodensis</i> (Antipodean Albatross)	V	V	The species ranges across the southern Pacific Ocean, east to the coast of Chile and west to eastern Australia. The Antipodean Albatross breeds biennially in colonies on ridges, slopes and plateaus of isolated subantarctic islands, usually in vegetation such as grass tussocks. This species regularly occurs in small numbers off the NSW south coast from Green Cape to Newcastle during winter where they feed on cuttlefish.	0	Low.
<i>Diomedea antipodensis gibsoni</i> (Gibson's Albatross)	V	-	The species is regularly encountered on trans-Tasman shipping routes and at seas off Sydney and regularly occurs off the NSW coast usually between Green Cape and Newcastle. This species is known only to breed on the Adams, Disappointment and Auckland Islands in the subantarctic Auckland Island group. Potential forage in NSW waters during the winter is considered significant for the species.	0	Low.
<i>Diomedea epomophora</i> (Southern Royal Albatross)	V	V	Breeding occurs on Adams, Enderby and Auckland Islands (Auckland Islands group), Campbell Island, and on Taiaroa Head (Otago Peninsula, South Island), New Zealand. This otherwise pelagic species is most commonly recorded in New Zealand and South American waters in the non-breeding season, but may circumnavigate all the way around the Southern Ocean	0	Low.
<i>Diomedea exulans</i> (Wandering Albatross)	E	-	The Wandering Albatross is marine, pelagic and aerial.	0	Low.
<i>Diomedea sanfordi</i> (Northern Royal Albatross)	E	E	Marine, subtropical to sub-Antarctic oceans; occasionally further south into the Antarctic.	0	Low.
<i>Diuris praecox</i> (Rough Doubletail)	V	V	Occurs between Ourimbah and Nelson Bay. Grows on hills and slopes of near-coastal districts in open forests which have a grassy to fairly dense understorey. Exists as subterranean tubers most of the year. It produces leaves and flowering stems in winter.	0	Moderate.
<i>Ephippiorhynchus asiaticus</i> (Black-necked Stork)	E	-	Mainly found on shallow, permanent, freshwater terrestrial wetlands, and surrounding marginal vegetation, including swamps, floodplains, watercourses and billabongs, freshwater meadows, wet heathland, farm dams and shallow floodwaters, as well as extending into adjacent grasslands, paddocks and open savannah woodlands. They also forage within or around estuaries and along intertidal shorelines, such as saltmarshes, mudflats and sandflats, and mangrove vegetation.	1	Low.
<i>Epthianura albifrons</i> (White-fronted Chat)	V	-	Low vegetation in salty coastal and inland areas and crops. Runs along ground and is found in local flocks in Winter.	0	Moderate.
<i>Erythrotriorchis radiatus</i> (Red Goshawk)	CE	E	The Red Goshawk occurs in coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia.	0	Moderate.
<i>Eucalyptus camfieldii</i>	V	V	Restricted distribution in a narrow band with the most northerly records in the Raymond Terrace Area south to Waterfall. Localised and scattered distribution includes sites at Norah Head (Tuggerah Lakes), Peats Ridge, Mt Colah, Elvina Bay Trail (West Head), Terrey Hills, Killara, North Head, Menai, Wattamolla and a few other sites in Royal National Park. Poor coastal country in shallow sandy soils overlying Hawkesbury sandstone. Coastal heath mostly on exposed sandy ridges. Occurs mostly in small, scattered stands near the boundary of tall coastal heaths and low open woodland of the slightly more fertile inland areas.	0	Low.
<i>Eucalyptus parramattensis subsp. decadens</i>	V	V	Generally, occupies deep, low-nutrient sands, often those subject to periodic inundation or where water tables are relatively high. It occurs in dry sclerophyll woodland with dry heath understorey. It also occurs as an emergent in dry or wet heathland. Often where this species occurs, it is a community dominant.	0	Moderate.
<i>Eucalyptus parramattensis subsp. parramattensis</i> (<i>Eucalyptus parramattensis</i> C. Hall. subsp. <i>parramattensis</i> in Wyong and Lake Macquarie local government areas)	EP	EP	Occurs within Wyong in the Porter's Creek and the Wallarah Creek catchments, on sandy alluvium within a floodplain community which also supports swamp mahogany, forest red gum, red bloodwood as well as paperbarks.	4	Low.
<i>Euphrasia arguta</i>	CE	CE	Occur in eucalypt forest with a mixed grass and shrub understorey within Nundle State Forest. Sites have either been logged in the last few decades or appear to have regrown from past clearing.	0	Moderate.
<i>Falco hypoleucos</i> (Grey Falcon)	E	V	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey.	0	Moderate.
<i>Falco subniger</i> (Black Falcon)	V	-	The Black Falcon is found along tree-lined watercourses and in isolated woodlands, mainly in arid and semi-arid areas. It roosts in trees at night and often on power poles by day.	0	Low.

Scientific Name (Common Name)	BC Act	EPBC Act	Habitat	Number of Records (DPE 2024)	Likelihood of Occurrence
<i>Falsistrellus tasmaniensis</i> (Eastern False Pipistrelle)	V	-	Inhabit sclerophyll forests, preferring wet habitats where trees are more than 20 m high. Two observations have been made of roosts in stem holes of living eucalypts. There is debate about whether or not this species moves to lower altitudes during winter, or whether they remain sedentary but enter torpor. This species also appears to be highly mobile and records showing movements of up to 12 km between roosting and foraging sites.	0	Moderate.
<i>Gallinago hardwickii</i> (Latham's Snipe)	-	M	Latham's Snipe is a non-breeding migrant to the south east of Australia including Tasmania, passing through the north and New Guinea on passage. Latham's Snipe breed in Japan and on the east Asian mainland. seen in small groups or singly in freshwater wetlands on or near the coast, generally among dense cover. They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and in saltmarsh and creek edges on migration.	2	Low.
<i>Glossopsitta pusilla</i> (Little Lorikeet)	V	-	Distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range in NSW, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri. Mostly occur in dry, open eucalypt forests and woodlands. They feed primarily on nectar and pollen in the tree canopy. Nest hollows are located at heights of between 2 m and 15 m, mostly in living, smooth-barked eucalypts. Most breeding records come from the western slopes.	14	High.
<i>Grantiella picta</i> (Painted Honeyeater)	V	V	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits boree, brigalow and box-gum woodlands and box-ironbark forests.	0	Low.
<i>Grevillea parviflora subsp. parviflora</i> (Small-flowered Grevillea)	V	V	Grows in sandy or light clay soils usually over thin shales. Occurs in a range of vegetation types from heath and shrubby woodland to open forest. Found over a range of altitudes from flat, low-lying areas to upper slopes and ridge crests. Often occurs in open, slightly disturbed sites such as along tracks.	226	Known.
<i>Haematopus fuliginosus</i> (Sooty Oystercatcher)	V	-	In NSW the Sooty Oystercatcher occupies rocky headlands, reefs and offshore islands along the entire coast, apparently as a single continuous population.	0	Low.
<i>Haematopus longirostris</i> (Pied Oystercatcher)	E	-	The Pied Oystercatcher inhabits marine littoral habitats, including islands. It occupies muddy, sandy, stony or rocky estuaries, inlets and beaches, particularly intertidal mudflats and sandbanks in large marine bays.	0	Low.
<i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle)	V	MAR	Inhabits coastal and near coastal areas, building large stick nests, and feeding mostly on marine and estuarine fish and aquatic fauna.	8	High.
<i>Heleioporus australiacus</i> (Giant Burrowing Frog)	V	V	The Giant Burrowing Frog has been recorded breeding in a range of water bodies associated with more sandy environments of the coast and adjacent ranges from the Sydney Basin south the eastern Victoria. It breeds in hanging swamps, perennial non-flooding creeks and occasionally permanent pools, but permanent water must be present to allow its large tadpoles time to reach metamorphosis.	0	Low.
<i>Hibbertia procumbens</i> (Spreading Guinea Flower)	E	-	Within NSW, known from several locations only on the Central Coast in the Gosford and Wyong LGAs. These populations are at Bumble Hill near Yarramalong in Wyong LGA; Kulnura, Strickland State Forest, Mangrove Mountain, Somersby, Calga/Mt White and Peats Ridge in the Gosford LGA; and near Mogo Creek to the west of Mangrove Creek Dam. Majority of known populations occur within heath banksia scrub on skeletal sandy soils. May also be found associated with upland swamps on sandy deposits.	1	High.
<i>Hieraaetus morphnoides</i> (Little Eagle)	V	-	Most abundant in lightly timbered areas with open areas nearby. Often recorded foraging in grasslands, crops, treeless dune fields, and recently logged areas. May nest in farmland, woodland and forest in tall trees.	0	Moderate.
<i>Hirundapus caudacutus</i> (White-throated Needletail)	-	MAR, M, V	An aerial species found in feeding concentrations over cities, hilltops and timbered ranges.	4	Moderate.
<i>Hoplocephalus bungaroides</i> (Broad-headed Snake)	V	V, M	Occurs almost exclusively in association with communities occurring on Triassic sandstone within the Sydney Basin. Typically found among exposed sandstone outcrops with vegetation types ranging from woodland to heath. Within these habitats they spend most of the year sheltering in and under rock crevices and exfoliating rock. However, some individuals will migrate to tree hollows to find shelter during hotter parts of summer.	0	Low.
<i>Hoplocephalus stephensii</i> (Stephens' Banded Snake)	V	-	The Stephens Banded Snake is found through the coast and adjacent ranges of NSW from the Central Coast northwards and into SE Queensland. It is most commonly found living in wet sclerophyll and rainforest areas but can be found in taller dry forest areas and even in some areas of dry forest where there is significant rock outcropping. They spend most of their time in tree-tops, either in large hollows or in dense vegetation, coming to the ground for forage for a range of vertebrates.	0	Moderate.
<i>Hydroprogne caspia</i> (Caspian Tern)	-	M	Patrols surf line and inshore waters. Prefers sheltered estuaries, inlets, bays, harbours and lagoons with muddy or sandy shores. Also extends well inland on freshwater or saltwater lakes, temporary floodwater, large rivers, reservoirs or sewage ponds.	1	Low.
<i>Isotoma fluviatilis subsp. fluviatilis</i>	-	Extinct	Grows in wet places around dams and creeks on coastal plains north and west of Sydney, south from Gloucester, sometimes becoming weedy in lawns.	0	Low.
<i>Ixobrychus flavicollis</i> (Black Bittern)	V	-	Usually found on coastal plains below 200 m. Often found along timbered watercourses, in wetlands with fringing trees and shrub vegetation. The sites where they occur are characterized by dense waterside vegetation.	1	High.
<i>Lathamus discolor</i> (Swift Parrot)	E	CE	The Swift Parrot occurs in woodlands and forests of NSW from May to August, where it feeds on eucalypt nectar, pollen and associated insects. The Swift Parrot is dependent on flowering resources across a wide range of habitats in its wintering grounds in NSW. This species is migratory, breeding in Tasmania, and nomadic, moving about in response to changing food availability.	4	High.
<i>Limosa lapponica</i> (Bar-tailed Godwit)	-	M	Found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. It is rarely found on inland wetlands or in areas of short grass, such as farmland, paddocks and airstrips, although it is commonly recorded in paddocks at some locations overseas.	0	Low.
<i>Limosa lapponica baueri</i> (Nunivak Bar-tailed Godwit)	-	E, M	Found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. It is rarely found on inland wetlands or in areas of short grass, such as farmland, paddocks and airstrips, although it is commonly recorded in paddocks at some locations overseas.	0	Low.
<i>Litoria aurea</i> (Green and Golden Bell Frog)	E	V	Inhabits a very wide range of water bodies including marshes, dams and streams, particularly those containing emergent vegetation such as bullrushes or spikerushes. It also inhabits numerous types of man-made water bodies including quarries and sand extraction sites. Optimum habitat includes water-bodies that are un-shaded, free of predatory fish such as Plague Minnow, have a grassy area nearby and diurnal sheltering sites available.	179	High.

Scientific Name (Common Name)	BC Act	EPBC Act	Habitat	Number of Records (DPE 2024)	Likelihood of Occurrence
<i>Litoria brevipalmata</i> (Green-thighed Frog)	V	-	This species is distributed from south-east Queensland to the NSW Central Coast. It occurs in a range of habitat types including rainforest, moist eucalypt forest, dry eucalypt forest and heath, but is most closely associated with wetter forest types in the southern part of its range. Calling and breeding is highly correlated with heavy rainfalls that lead to the formation of large ephemeral pools in a range of sites, but always in association with some native vegetation. Calling occurring only for one or two nights at a time anywhere between September and May.	0	Moderate.
<i>Litoria littlejohni</i> (Littlejohn's Tree Frog)	V	V	Occurs in wet and dry sclerophyll forests and heathland associated with sandstone outcrops between 280 and 1000 m on the eastern slopes of the Great Dividing Range from the Central Coast down into Victoria. Individuals have been collected from a wide range of water bodies that includes semi-permanent dams, permanent ponds, temporary pools and permanent streams, with calling occurring from fringing vegetation or on the banks. Individuals have been observed sheltering under rocks on high exposed ridges during summer and within deep leaf litter adjacent to the breeding site. Calling occurs in all months of the year, often in association with heavy rains. The tadpoles are distinctive, being large and very dark in colouration.	0	Moderate.
<i>Lophoictinia isura</i> (Square-tailed Kite)	V	-	Typically inhabits coastal forested and wooded lands of tropical and temperate Australia. In NSW it is often associated with ridge and gully forests dominated by <i>Eucalyptus longifolia</i> , <i>Corymbia maculata</i> , <i>E. elata</i> or <i>E. smithii</i> . Individuals appear to occupy large hunting ranges of more than 100km2. They require large living trees for breeding, particularly near water with surrounding woodland -forest close by for foraging habitat. Nest sites are generally located along or near watercourses, in a tree fork or on large horizontal limbs.	0	Moderate.
<i>Macronectes giganteus</i> (Southern Giant Petrel)	E	E	The Southern Giant Petrel has a circumpolar pelagic range from Antarctica to approximately 20 S and is a common visitor off the coast of NSW. Over summer, the species nests in small colonies amongst open vegetation on Antarctic and subantarctic islands, including Macquarie and Heard Islands and in Australian Antarctic territory.	0	Low.
<i>Macronectes halli</i> (Northern Giant-petrel)	V	V	Breeding in Australian territory is limited to Macquarie Island and occurs during spring and summer.	0	Low.
<i>Maundia triglochinox</i>	V	-	Grows in swamps, creeks or shallow freshwater 30 - 60 cm deep on heavy clay, low nutrients. Flowering occurs during warmer months. Diaspore is the seed and root tubers, which are probably dispersed by water.	9	High.
<i>Melaleuca biconvexa</i> (Biconvex Paperbark)	V	V	Grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects. Scattered and dispersed populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north.	161	High.
<i>Melanodryas cucullata cucullata</i> (Hooded Robin (south-eastern form))	V	E	Occupy a wide range of eucalypt woodlands, Acacia shrublands and open forests.	0	Moderate.
<i>Micronomus norfolkensis</i> (Eastern Coastal Free-tailed Bat)	V	-	Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures (OEH, 2022).	4	Known
<i>Miniopterus australis</i> (Little Bentwing-bat)	V	-	Coastal north-eastern NSW and eastern Queensland. Little Bent-wing Bat is an insectivorous bat that roost in caves, in old mines, in tunnels, under bridges, or in similar structures. They breed in large aggregations in a small number of known caves and may travel 100s km from feeding home ranges to breeding sites. Little Bent-wing Bat prefers moist eucalypt forest, rainforest or dense coastal banksia scrub where it forages below the canopy for insects.	5	Known
<i>Miniopterus orianae oceanensis</i> (Large Bent-winged Bat)	V	-	Eastern Bent-winged-bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Hunt in forested areas, catching moths and other flying insects above the tree tops (OEH, 2019).	1	Known
<i>Mixophyes balbus</i> (Stuttering Frog)	E	V	Associated with streams in dry sclerophyll and wet sclerophyll forests and rainforests of more upland areas of the Great Dividing Range of NSW and down into Victoria. Breeding occurs along forest streams with permanent water where eggs are deposited within nests excavated in riffle zones by the females and the tadpoles swim free into the stream when large enough to do so. Outside of breeding, individuals range widely across the forest floor and can be found hundreds of metres from water.	2	Low.
<i>Mixophyes iteratus</i> (Giant Barred Frog)	E	V	This species is found along larger streams of the coast and adjacent ranges of NSW and SE QLD. It inhabits rainforest and wet sclerophyll forest but is also found within cleared farmland where fringing vegetation is retained, including lantana beds. Many sites where the Giant Barred Frog is known to occur are the lower reaches of streams which have been affected by major disturbances such as clearing, timber harvesting and urban development in their headwaters.	11	Low.
<i>Monarcha melanopsis</i> (Black-faced Monarch)	-	M	Found along the coast of eastern Australia, becoming less common further south. Inhabits rainforests, eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating.	0	Moderate.
<i>Motacilla flava</i> (Yellow Wagtail)	-	MAR, M	Occupies a range of damp or wet habitats with low vegetation, from damp meadows, marshes, waterside pastures, sewage farms and bogs to damp steppe and grassy tundra. In the north of its range, it is also found in large forest clearings.	0	Low.
<i>Myiagra cyanoleuca</i> (Satin Flycatcher)	-	M	The Satin Flycatcher is found along the east coast of Australia from far northern Queensland to Tasmania, including south-eastern South Australia. Found in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests.	0	Low.
<i>Myotis macropus</i> (Southern Myotis)	V	-	The Large-footed Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. They generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage.	3	High.
<i>Neophema chrysostoma</i> (Blue-winged Parrot)	-	V	The blue-winged parrot is found across southeastern Australia. In eastern South Australia, it is found north to the Flinders Ranges, and across Victoria. It is more sporadic across central and western New South Wales and into Queensland, as far north as Diamantina National Park. It lives in savannah woodland, grasslands, orchards, farmlands, marshes, heath, dunes, and other open habitats up to 1,200 m (3,937 ft) above sea level. It is one of only three species of parrot that make regular yearly migrations over a sea or ocean, with many members of the species flying between Tasmania, where they breed in spring and summer, and the mainland, where they winter. Some birds, however, do remain in Tasmania over the winter and some remain on the mainland to breed in the summer.	0	Moderate.
<i>Neophema pulchella</i> (Turquoise Parrot)	V	-	The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Nests in tree hollows, logs or posts, from August to December. It lays four or five white, rounded eggs on a nest of decayed wood dust.	0	Low.
<i>Ninox connivens</i> (Barking Owl)	V	-	Generally found in open forests, woodlands, swamp woodlands and dense scrub. Can also be found in the foothills and timber along watercourses in otherwise open country.	0	Low.

Scientific Name (Common Name)	BC Act	EPBC Act	Habitat	Number of Records (DPE 2024)	Likelihood of Occurrence
<i>Ninox strenua</i> (Powerful Owl)	V	-	Occupies wet and dry eucalypt forests and rainforests. Can occupy both un-logged and lightly logged forests as well as undisturbed forests where it usually roosts on the limbs of dense trees in gully areas. It is most commonly recorded within red turpentine in tall open forests and black she-oak within open forests. Large mature trees with hollows at least 0.5 m deep are required for nesting. Tree hollows are particularly important for the Powerful Owl because a large proportion of the diet is made up of hollow-dependent arboreal marsupials. Nest trees for this species are usually emergent with a diameter at breast height of at least 100 cm.	10	High.
<i>Notamacropus parma</i> (Parma Wallaby)	V	V	Once occurred from north-eastern NSW to the Bega area in the southeast. Their range is now confined to the coast and ranges of central and northern NSW from the Gosford district to the Queensland border. Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest.	0	Low.
<i>Numenius madagascariensis</i> (Eastern Curlew)	-	CE	The Eastern curlew spends its breeding season in northeastern Asia, including Siberia to Kamchatka, and Mongolia. Its breeding habitat is composed of marshy and swampy wetlands and lakeshores. Most individuals winter in coastal Australia, with a few headings to South Korea, Thailand, Philippines and New Zealand, where they stay at estuaries, beaches, and salt marshes. It uses its long, decurved bill to probe for invertebrates in the mud. It may feed in solitude, but it generally congregates in large flocks to migrate or roost. Its call is a sharp, clear whistle, cuuue-reee, often repeated.	0	Low.
<i>Numenius phaeopus</i> (Whimbrel)	-	M, MAR	Intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries and river deltas, often those with mangroves, but also open, unvegetated mudflats. Roosts in mangroves and other structures flooded at high tide.	0	Low.
<i>Oxyura australis</i> (Blue-billed Duck)	V	-	Widespread in NSW, but most common in the southern Murray-Darling Basin area. Birds disperse during the breeding season to deep swamps up to 300 km away. It is generally only during summer or in drier years that they are seen in coastal areas. The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation.	0	Low.
<i>Pachyptila turtur subantarctica</i> (Fairy Prion)	V	V	The fairy prion is the smallest prion, and it measures between 23 and 28 cm (9.1–11.0 in) long. [2] Its plumage is blue-grey on its upperparts, and white underneath. They have a dark "M" on their upperparts extending to their wingtips, and their tail is wedge-shaped with a dark tip. They have a blue bill and feet. The diet consists mainly of planktonic crustaceans and other tiny sea animals, which they feed at night from the water's surface. They breed colonially and prefer small islands. The nest is situated in soil, hidden by vegetation and is dug with the bill or feet, or it is in a hollow in a crevice. When coming back to their nest at night, they will coo softly and listen for their mate. The fairy prion is found throughout oceans and coastal areas in the Southern Hemisphere. Their colonies can be found on Chatham, Snares and Antipodes Islands of New Zealand, Bass Strait Islands of Australia, Falkland Islands, Marion Island, the Crozet Islands and Macquarie Island. Outside of the breeding season, the fairy prion is most often found feeding over deep waters, far from shore. During stormy weather it may come towards coastal habitats. It breeds on oceanic islands, where it nests in crevices on cliffs and rock falls or in burrows in soil, although it may also nest in scrub, herblands, tussock or pasture.	0	Moderate.
<i>Pandion cristatus</i> (Eastern Osprey)	V	M, MAR	Eastern Ospreys are found right around the Australian coastline, except for Victoria and Tasmania. They are common around the northern coast, especially on rocky shorelines, islands and reefs. The species is uncommon to rare or absent from closely settled parts of south-eastern Australia. There are a handful of records from inland areas. Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.	14	Low.
<i>Pandion haliaetus</i> (Osprey)	V	-	Ospreys are found right around the Australian coast line, except for Victoria and Tasmania. They are common around the northern coast, especially on rocky shorelines, islands and reefs. The species is uncommon to rare or absent from closely settled parts of south-eastern Australia. Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water.	0	Moderate.
<i>Persicaria elatior</i>	V	V	This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	1	Moderate.
<i>Petauroides Volans</i> (Greater Glider)	-	E	The Greater Glider occurs in eucalypt forests and woodlands. Utilise tree hollows	0	Moderate.
<i>Petaurus australis</i> (Yellow-bellied Glider)	V	V	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria.	10	High.
<i>Petaurus australis australis</i> (Yellow-bellied Glider (South-eastern))	-	V	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein. Extract sap by incising (or biting into) the trunks and branches of favoured food trees, often leaving a distinctive ‘V’ -shaped scar. Live in small family groups of two - six individuals and are nocturnal. Den, often in family groups, in hollows of large trees. Very mobile and occupy large home ranges between 20 to 85 ha to encompass dispersed and seasonally variable food resources.	0	Moderate
<i>Petaurus norfolcensis</i> (Squirrel Glider)	V	-	Generally, occurs in dry sclerophyll forests and woodlands but is absent from dense coastal ranges in the southern part of its range. Requires abundant hollow bearing trees and a mix of eucalypts, banksias and acacias. There is only limited information available on den tree use by Squirrel gliders, but it has been observed using both living and dead trees as well as hollow stumps. Within a suitable vegetation community at least one species should flower heavily in winter and one species of eucalypt should be smooth barked. Endangered population in the Wagga Wagga LGA.	28	High.
<i>Petrogale penicillata</i> (Brush-tailed Rock-wallaby)	E	V	Found in rocky areas in a wide variety of habitats including rainforest gullies, wet and dry sclerophyll forest, open woodland and rocky outcrops in semi-arid country. Commonly sites have a northerly aspect with numerous ledges, caves and crevices.	2	Low.
<i>Petroica boodang</i> (Scarlet Robin)	V	-	The Scarlet Robin is found from SE Queensland to SE South Australia and also in Tasmania and SW Western Australia. In NSW, it occurs from the coast to the inland slopes. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs.	1	High.
<i>Phascogale tapoatafa</i> (Brush-tailed Phascogale)	V	-	The Brush-tailed Phascogale has a patchy distribution around the coast of Australia. In NSW it is mainly found east of the Great Dividing Range although there are occasional records west off the divide. Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest.	0	Moderate.

Scientific Name (Common Name)	BC Act	EPBC Act	Habitat	Number of Records (DPE 2024)	Likelihood of Occurrence
<i>Phascolarctos cinereus</i> (Koala)	E	E	Inhabits eucalypt forests and woodlands. The suitability of these forests for habitation depends on the size and species of trees present, soil nutrients, climate and rainfall.	24	High.
<i>Phoniscus papuensis</i> (Golden-tipped Bat)	V	-	Distributed along the east coast of Australia in scattered locations from Cape York Peninsula in Queensland to Bega in southe rn NSW. Found in rainforest and adjacent sclerophyll forest. Roost in abandoned hanging Yellow-throated Scrubwren and Brown Gerygone nests located in rainforest gullies on small first- and second-order streams.	0	Low.
<i>Pluvialis fulva</i> (Pacific Golden Plover)	-	M	Mainly coastal habitats; usually in small parties or quite large flocks on estuaries, intertidal mudflats, beaches, reefs, saltmarshes and offshore islands; only rarely far inland.	0	Low.
<i>Pluvialis squatarola</i> (Grey Plover)	-	M, MAR, V	In Australia, Grey Plovers occur almost entirely in coastal areas, where they usually inhabit sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. They also occur around terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes. The species is also very occasionally recorded further inland, where they occur around wetlands or salt-lakes.	3	Low.
<i>Pomaderris brunnea</i> (Brown Pomaderris)	V	V	The species is expected to live for 10 - 20 years, while the minimum time to produce seed is estimated to be 4 - 6 years. Found in a very limited area around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area. It also occurs at Walcha on the New England Tableland and in far eastern Gippsland in Victoria.	0	Low.
<i>Pomatostomus temporalis temporalis</i> (Grey-crowned Babbler (eastern subspecies))	V	-	In NSW, the eastern sub-species occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. It also occurs in woodlands in the Hunter Valley and in several locations on the north coast of NSW. It may be extinct in the southern, central and New England tablelands. Inhabits open box-gum woodlands on the slopes, and box-cypress-pine and open box woodlands on alluvial plains.	0	Low.
<i>Potorous tridactylus tridactylus</i> (Long-nosed Potoroo (Southern Mainland))	V	V	Inhabits coastal heath and wet and dry sclerophyll forests. Generally found in areas with rainfall greater than 760 mm. Requires relatively thick ground cover where the soil is light and sandy.	0	Moderate.
<i>Pseudomys novaehollandiae</i> (New Holland Mouse)	-	V	The New Holland Mouse currently has a disjunct, fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Across the species' range the New Holland Mouse is known to inhabit open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes.	0	Moderate.
<i>Pseudophryne australis</i> (Red-crowned Toadlet)	V	-	Occurs on wetter ridge tops and upper slopes of sandstone formations on which the predominant vegetation is dry open forests and heaths. This species typically breeds within small ephemeral creeks that feed into larger semi-perennial streams. After rain, these creeks are characterised by a series of shallow pools lined by dense grasses, ferns and low shrubs and usually contain leaf litter for shelter. Eggs are terrestrial and laid under litter, vegetation or rocks where the tadpoles inside will reach a relatively late stage of development before waiting for flooding waters before hatching will occur.	1	Low.
<i>Pteropus poliocephalus</i> (Grey-headed Flying-fox)	V	V	This species is a canopy-feeding frugivore and nectarivore of rainforests, open forests, woodlands, melaleuca swamps and banksia woodlands. Bats commute daily to foraging areas, usually within 15 km of the day roost although some individuals may travel up to 70 km.	68	High.
<i>Ptilinopus magnificus</i> (Wompoo Fruit-dove)	V	-	Distributed north of the Hunter River in NSW on the coast and coastal ranges. Inhabits rainforest, monsoon forest, adjacent eucalypt forest and brush box forest.	1	High.
<i>Ptilinopus regina</i> (Rose-crowned Fruit-dove)	V	-	Coast and ranges of eastern NSW and Queensland, from Newcastle to Cape York. Vagrants are occasionally found further south to Victoria. Rose-crowned Fruit-doves occur mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful.	0	Low.
<i>Ptilinopus superbus</i> (Superb Fruit-dove)	V	-	The Superb Fruit-dove occurs principally from north-eastern in Queensland to north-eastern NSW. It is much less common further south, where it is largely confined to pockets of suitable habitat as far south as Moruya. There are records of vagrants as far south as eastern Victoria and Tasmania. Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees.	0	Low.
<i>Pycnoptilus floccosus</i> (Pilot bird)	-	V	Pilotbirds are endemic to south-east Australia. Upland Pilotbirds occur above 600 m in the Brindabella Ranges in the Australian Capital Territory, and in the Snowy Mountains in New South Wales and north-east Victoria (Higgins & Peter 2002; Loyn et al. 2021). Lowland Pilotbirds occur in forests from the Blue Mountains west of Newcastle, around the wetter forests of eastern Australia, to Dandenong near Melbourne	0	Low.
<i>Rhipidura rufifrons</i> (Rufous Fantail)	-	M	Found along the east coast of Australia from far northern Queensland to Tasmania, including south-eastern South Australia. Inhabits tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests.	0	Low.
<i>Rhizanthella slateri</i>	V, EP (Great Lakes)	E	Habitat requirements are poorly understood, and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest.	1	Moderate.
<i>Rhodamnia rubescens</i> (Scrub Turpentine)	CE	CE	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. This species is characterised as highly to extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	15	Low.
<i>Rhodomyrtus psidioides</i> (Native Guava)	CE	CE	Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. This species is characterised being extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	2	Low.
<i>Rutidosia heterogama</i>	V	V	Grows in heath on sandy soils and moist areas in open forest, and has been recorded along disturbed roadsides.	304	High.
<i>Saccolaimus flaviventris</i> (Yellow-bellied Sheathtail-bat)	V	-	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.	2	Known
<i>Scoteanax rueppellii</i> (Greater Broad-nosed Bat)	V	-	Prefer moist gullies in mature coastal forests and rainforests, between the Great Dividing Range and the coast. They are only found at low altitudes below 500 m. In dense environments they utilise natural and human-made opening in the forest for flight paths. Creeks and small rivers are favoured foraging habitat. This species roosts in hollow tree trunks and branches.	0	Moderate.
<i>Stagonopleura guttata</i> (Diamond Firetail)	V	V	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities.	0	Moderate.



Scientific Name (Common Name)	BC Act	EPBC Act	Habitat	Number of Records (DPE 2024)	Likelihood of Occurrence
			Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season). Usually encountered in flocks of between 5 to 40 birds, occasionally more. Groups separate into small colonies to breed, between August and January. Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests. Birds roost in dense shrubs or in smaller nests built especially for roosting. Appears to be sedentary, though some populations move locally, especially those in the south. Has been recorded in some towns and near farm houses.		
<i>Sterna hirundo</i> (Common Tern)	-	MAR, M	Non-breeding migrant to Australia, where it is widespread and common on the eastern coast south to eastern Victoria, and common on parts of the northern coast, mainly east of Darwin. In Australia, they are recorded in all marine zones, but are commonly observed in near-coastal waters, both on ocean beaches, platforms and headlands and in sheltered waters, such as bays, harbours and estuaries with muddy, sandy or rocky shores.	0	Low.
<i>Sternula nereis nereis</i> (Fairy Tern)	-	V	Distribution includes the southern half of NSW coast. Fairy Terns utilise a variety of habitats including offshore, islands in estuaries or lakes, wetlands, beaches and spits.	0	Low.
<i>Stictonetta naevosa</i> (Freckled Duck)	V	-	The freckled duck breeds in permanent fresh swamps that are heavily vegetated. Found in fresh or salty permanent open lakes, especially during drought. Often seen in groups on fallen trees and sand spits.	0	Low.
<i>Symposiachrus trivirgatus</i>	-	MAR, M	Coastal north-eastern and eastern Australia, including coastal islands, from Cape York, Queensland to Port Stephens, New South Wales. Prefers thick understorey in rainforests, wet gullies, and waterside vegetation, as well as mangroves.	0	Low.
<i>Syzygium paniculatum</i> (Magenta Lilly Pilly)	E	V, M	Found only in NSW, in a narrow, linear coastal strip from Bulahdelah to Conjola State Forest. On the south coast the species occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral rainforest. On the central coast it occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities	3	Low.
<i>Tetradlea juncea</i> (Black-eyed Susan)	V	V	Confined to the northern portion of the Sydney Basin bioregion and the southern portion of the North Coast bioregion in the local government areas of Wyong, Lake Macquarie, Newcastle, Port Stephens, Great Lakes and Cessnock. It is usually found in low open forest-woodland with a mixed shrub understorey and grassy groundcover. The majority of populations occur on low nutrient soils associated with the Awaba Soil Landscape. Cryptic species that requires survey in September-October.	3541	Known.
<i>Thelymitra adorata</i> (Wyong Sun Orchid)	CE	CE	Occurs from 10-40 m a.s.l. in grassy woodland or occasionally derived grassland in well-drained clay loam or shale derived soils. The vegetation type in which the majority of populations occur (including the largest colony) is a spotted gum - ironbark forest with a diverse grassy understorey and occasional scattered shrubs.	0	High.
<i>Thesium australe</i> (Austral Toadflax)	V	V	Grows in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. It is also found in Tasmania and Queensland and in eastern Asia. Occurs in grassland or grassy woodland. Grows on kangaroo grass tussocks but has also been recorded within the exotic coolatai grass.	0	Moderate.
<i>Tringa brevipes</i> (Grey-tailed tattler)	-	M, MAR	Sheltered coasts with reefs and rock platforms or with intertidal mudflats. It can also be found at intertidal rocky, coral or stony reefs as well as platforms and islets that are exposed at low tide. It has been found around shores of rock, shingle, gravel or shells and also on intertidal mudflats in embayments, estuaries and coastal lagoons, especially fringed with mangroves.	0	Low.
<i>Tringa nebularia</i> (Common Greenshank)	-	M, E	Habitat is diverse, both inland and coastal. Found inland on both permanent and temporary wetland - billabongs, swamps, lakes, floodplains, sewage, farms and saltwater ponds. On the coast, it uses sheltered estuaries and bays with extensive mudflats, mangrove swamps, muddy shallows of harbours and lagoons and occasionally rocky tidal edges.	0	Low.
<i>Tringa stagnatilis</i> (Marsh Sandpiper)	-	M, MAR	Permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, salt pans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes.	0	Low.
<i>Turnix maculosus</i> (Red-backed Button-quail)	V	-	Red-backed Button-quail inhabit grasslands, open and savannah woodlands with grassy ground layer, pastures and crops of warm temperate areas, typically only in regions subject to annual summer rainfall greater than 400 mm. In NSW, said to occur in grasslands, heath and crops. Said to prefer sites close to water, especially when breeding. Observations of populations in other parts of its range suggest the species prefers sites near water, including grasslands and sedgeland near creeks, swamps and springs, and wetlands.	0	Low.
<i>Tyto novaehollandiae</i> (Masked Owl)	V	-	Inhabits a diverse range of wooded habitat that provide tall or dense mature trees with hollows suitable for nesting and roosting. Mostly recorded in open forest and woodlands adjacent to cleared lands. Nest in hollows, in trunks and in near vertical spouts or large trees, usually living but sometimes dead. Nest hollows are usually located within dense forests or woodlands. Masked owls prey upon hollow-dependent arboreal marsupials, but terrestrial mammals make up the largest proportion of the diet.	0	Known
<i>Tyto tenebricosa</i> (Sooty Owl)	V	-	Often found in tall old-growth forests, including temperate and subtropical rainforests. In NSW mostly found on escarpments with a mean altitude less than 500 metres. Nests and roosts in hollows of tall emergent trees, mainly eucalypts often located in gullies. Nests have been located in trees 125 to 161 centimetres in diameter.	0	Moderate.
<i>Uperoleia mahonyi</i> (Mahony's Toadlet)	E	E	Current observations indicate Mahony's Toadlet inhabits ephemeral and semi-permanent swamps and swales on the coastal fringe of its range. Known records occur in heath or wallum habitats almost exclusively associated with leached (highly nutrient impoverished) white sand. Commonly associated with acid paperbark swamps, Mahony's Toadlet also is known to occur in wallum heath, swamp mahogany-paperbark swamp forest, heath shrubland and Sydney red gum woodland. Recent studies suggest intact vegetation adjacent to and within water bodies is an important habitat feature for this species. Known records are associated with shallow ephemeral/semi-permanent water bodies with limited flow of water. Aquatic vegetation at breeding sites includes sedges (Shoenoplectus spp., Baumea spp. and Lepironia articulata) and Broadleaf Cumbungi (Typha orientalis). Females have been recorded up to 400m from water-bodies indicating moderate dispersal distances and use of multiple habitat types.	0	Moderate.

Scientific Name (Common Name)	BC Act	EPBC Act	Habitat	Number of Records (DPE 2024)	Likelihood of Occurrence
			Tadpoles have been observed using leaf litter in the shallow verges of water bodies on sandy substrate. Rocks, logs and leaf litter may also be used for shelter and provide important foraging areas for invertebrate prey items.		
<i>Vespadelus trougtoni</i> (Eastern Cave Bat)	V	-	The Eastern Cave Bat is found in a broad band on both sides of the Great Dividing Range from Cape York to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT. A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals.	1	Moderate.

Key: V = Vulnerable, E = Endangered, CE = Critically Endangered, EP = Endangered Population, M = Migratory, MAR = Marine



Appendix C – Vegetation survey data

TABLE C1- BAM PLOT HABITAT FUNCTION ASSESSMENT

BAM Plot						Habitat Function			Tree Stem Size Class (cm)							Other	
Plot	PCT	Condition class	Easting	Northing	Bearing	Hollow trees	Litter Cover Mean (%)	Fallen Logs	<5	5 to 9	10 to 19	20 to 29	30 to 49	50 to 79	80+	Tree Regen	High Threat Exotic
BHMT1	3583	High	151.4957685	- 33.05661258	322	7	66	26	YES	YES	YES	YES	YES	3	1	NO	NO
ER092BHJC1	3583	High	151.5	-33.055841	129	1	52	40	YES	YES	YES	YES	YES	2	0	YES	NO
ER092BHJC2	3583	High	151.5	-33.055441	265	1	70	28	YES	YES	YES	YES	NO	6	1	YES	NO

TABLE C2- FLORISTICS COVER AND ABUNDANCE DATA

BAM Plot		Composition (species richness)								Structure (cover %)								
Plot	TG	SG	GG	FG	EG	OG	Exotic	HTW	HTW (M)	TG	SG	GG	FG	EG	OG	Exotic	HTW	HTW (M)
BHMT1	4	11	3	0	1	1	0	0	0	72	35.11	11.1	0	0.1	70	0	0	0
ER092BHJC1	5	11	4	0	0	2	0	0	0	43	25	48.5	0	0	30	0	0	0
ER092BHJC2	5	9	6	0	0	2	0	0	0	52	26	70	3	0	20	0	0	0





TABLE C3 - FLORISTICS COVER AND ABUNDANCE DATA

Family	Scientific Name	Common Name	Form	Plot ID					
				BHMT1		ER092BHJC1		ER092BHJC2	
				C	A	C	A	C	A
Fabaceae (Mimosoideae)	<i>Acacia spp.</i>	Wattle	Shrub (SG)					1	1
Casuarinaceae	<i>Allocasuarina littoralis</i>	Black She-Oak	Tree (TG)			3	0	15	10
Poaceae	<i>Andropogon virginicus</i>	Whisky Grass	HTW					.01	1
Poaceae	<i>Aristida vagans</i>	Threeawn Speargrass	Grass & grasslike (GG)					.5	5
Proteaceae	<i>Banksia integrifolia</i>	Coast Banksia	Tree (TG)			5	7	2	1
Proteaceae	<i>Banksia serrata</i>	Old-man Banksia	Tree (TG)	2	5				
Proteaceae	<i>Banksia spinulosa</i>	Hairpin Banksia	Shrub (SG)	5	10	10	6	5	3
Fabaceae (Faboideae)	<i>Bossiaea obcordata</i>	Spiny Bossiaea	Shrub (SG)			3	3	1	2
Lauraceae	<i>Cassytha spp.</i>	-	Other (OG)			.5	10	.5	10
Polygalaceae	<i>Comesperma ericinum</i>	Pyramid Flower	Shrub (SG)			.01	1		
Myrtaceae	<i>Corymbia gummifera</i>	Red Bloodwood	Tree (TG)	5	1	15	4	15	2
Goodeniaceae	<i>Dampiera stricta</i>	-	Forb (FG)			3	15		
Fabaceae (Faboideae)	<i>Dillwynia retorta</i>	-	Shrub (SG)			3	2	2	2
Droseraceae	<i>Drosera binata</i>	Forked Sundew	Forb (FG)			.01	1	.1	3
Poaceae	<i>Entolasia stricta</i>	Wiry Panic	Grass & grasslike (GG)	10	500	40	1000	70	1000
Ericaceae	<i>Epacris pulchella</i>	Wallum Heath	Shrub (SG)	1	10	.5	10	1	5
Myrtaceae	<i>Eucalyptus capitellata</i>	Brown Stringybark	Tree (TG)	50	5				
Myrtaceae	<i>Eucalyptus globoidea</i>	White Stringybark	Tree (TG)			5	1	5	1
Myrtaceae	<i>Eucalyptus haemastoma</i>	Broad-leaved Scribbly Gum	Tree (TG)	15	4	15	4	15	3
Myrtaceae	<i>Eucalyptus resinifera</i>	Red Mahogany	Tree (TG)	0	0				
Proteaceae	<i>Grevillea parviflora</i>	-	Shrub (SG)	0.01	1				
Proteaceae	<i>Hakea bakeriana</i>	-	Shrub (SG)	10	10	2	3		
Proteaceae	<i>Hakea dactyloides</i>	Finger Hakea	Shrub (SG)	2	5	5	10	3	2
Fabaceae (Faboideae)	<i>Hovea linearis</i>	-	Forb (FG)			.01	1	.01	1
Proteaceae	<i>Isopogon anemonifolius</i>	Broad-leaf Drumsticks	Shrub (SG)			5	10	3	2





Family	Scientific Name	Common Name	Form	Plot ID					
				BHMT1		ER092BHJC1		ER092BHJC2	
				C	A	C	A	C	A
Proteaceae	<i>Lambertia formosa</i>	Mountain Devil	Shrub (SG)	2	5	5	3	5	3
Cyperaceae	<i>Lepidosperma laterale</i>	Variable Sword-sedge	Grass & grasslike (GG)	1	3	5	20		
Myrtaceae	<i>Leptospermum juniperinum</i>	Prickly Tea-tree	Shrub (SG)			5	3	10	3
Myrtaceae	<i>Leptospermum polygalifolium</i>	Tantoon	Shrub (SG)	2	5				
Myrtaceae	<i>Leptospermum trinervium</i>	Slender Tea-tree	Shrub (SG)	10	4				
Lindsaeaceae	<i>Lindsaea dimorpha</i>	-	Fern (EG)	0.1	10				
Lomandraceae	<i>Lomandra obliqua</i>	-	Grass & grasslike (GG)			0.5	5	.5	10
Fabaceae (Faboideae)	<i>Mirbelia rubiifolia</i>	Heathy Mirbelia	Shrub (SG)					.01	1
Iridaceae	<i>Patersonia sericea</i>	Silky Purple-Flag	Forb (FG)			5	20	3	10
Proteaceae	<i>Persoonia linearis</i>	Narrow-leaved Geebung	Shrub (SG)	1	3				
Thymelaeaceae	<i>Pimelea linifolia</i>	Slender Rice Flower	Shrub (SG)	0.1	2				
Apiaceae	<i>Platysace linearifolia</i>	-	Shrub (SG)	2	30				
Cyperaceae	<i>Ptilothrix deusta</i>	-	Grass & grasslike (GG)					.01	1
Poaceae	<i>Rytidosperma pallidum</i>	Silvertop Wallaby Grass	Grass & grasslike (GG)					.01	1
Poaceae	<i>Rytidosperma spp.</i>	-	Grass & grasslike (GG)			3	5		
Elaeocarpaceae	<i>Tetratheca juncea</i>	Black-eyed Susan	Shrub (SG)			2	3		
Poaceae	<i>Themeda triandra</i>	Kangaroo Grass	Grass & grasslike (GG)	0.1	2			.01	1
Xanthorrhoeaceae	<i>Xanthorrhoea spp.</i>	-	Other (OG)	70	150	30	20	20	25

Note: C = Percentage Cover, A = Abundance



Appendix D – Weather conditions

TABLE D 1 – CAMERA TRAPPING WEATHER CONDITIONS

Type	Number of cameras deployed	Bait	Target species	Deployment	Collection	Date	Temperature (°C)		Rainfall (mm)	Mean wind speed (km/h)
							Min.	Max.		
Ground	2	Sardines	<i>Dasyurus maculatus</i> (Spotted-tailed quoll)	13/02/2023	17/02/2023.	13/02/2023	21.7	25.4	15.4	26
						14/02/2023	18.1	23.6	0.2	26
						15/02/2023	17.6	29.1	11	26
						16/02/2023	15.6	36.1	0	26
						17/02/2023	15.4	32.8	0	26
Arboreal	2	Oat and peanut butter mix.	<i>Pseudomys novaehollandiae</i> (New-Holland Mouse) <i>Cercartetus nanus</i> (Eastern Pygmy possum) <i>Petrogale penicillata</i> (Brush-tailed Rock-Wallaby) <i>Phascogale tapoatafa</i> (Brush Tailed Rock- Phascogale) <i>Planigale maculata</i> (Common Planigale) <i>Potorous tridactylus tridactylus</i> (Long-nosed Potoroo) <i>Petauroides volans</i> (Greater Glider) <i>Petaurus norfolcensis</i> (Squirrel Glider) <i>Petaurus australis australis</i> (Yellow-bellied Glider)	13/02/2023	17/02/2023.	13/02/2023	21.7	25.4	15.4	26
						14/02/2023	18.1	23.6	0.2	26
						15/02/2023	17.6	29.1	11	26
						16/02/2023	15.6	36.1	0	26
						17/02/2023	15.4	32.8	0	26
4 arboreal, 1 star picket outside HBT	5	N/A	<i>Calyptorhynchus lathami lathami</i> (Glossy Black Cockatoo)	16/07/2024	24/07/2024.	16/07/2024	5.3	14.9	0	39
						17/07/2024	10.7	19.2	0	28
						18/07/2024	6.5	19.1	0	20
						19/07/2024	5.2	17.6	0	30
						20/07/2024	11.3	17.6	0	54
						21/07/2024	9.0	19.1	0	28
						22/07/2024	2.0	19.4	0	15
						23/07/2024	1.9	20.1	0	15
						24/07/2024	1.4	20.4	0	24
						25/07/2014	4.2	22.8	0	31
						26/07/2024	9.2	21.6	4.2	19
						16/07/2024	5.3	14.9	0	39
						17/07/2024	10.7	19.2	0	28
						18/07/2024	6.5	19.1	0	20
						19/07/2024	5.2	17.6	0	30
						20/07/2024	11.3	17.6	0	54
						21/07/2024	9.0	19.1	0	28
						22/07/2024	2.0	19.4	0	15
						23/07/2024	1.9	20.1	0	15
						24/07/2024	1.4	20.4	0	24
						25/07/2014	4.2	22.8	0	31
						26/07/2024	9.2	21.6	4.2	19

TABLE D 2 – FUNNEL TRAPPING WEATHER CONDITIONS

Number of funnel traps deployed	Target species	Deployment	Collection	Date	Temperature (°C)		Rainfall (mm)	Mean wind speed (km/h)	Relative humidity (%)	Moon phase
					Min.	Max.				
18	<i>Hoplocephalus bitorquatus</i> (Pale headed snake) <i>Hoplocephalus bungaroides</i> (Broad-headed Snake) <i>Hoplocephalus stephensii</i> (Stephens’ Banded Snake)	13/02/2023	17/02/2023.	11/02/2023 (2 days prior to survey)	-	-	0	-	-	-
				13/02/2023	20.2	25.9	15.4	26	92	Waning Gibbous (56% illuminated)
				14/02/2023	18.8	22.5	0.2	26	80	Last Quarter (46% illuminated)
				15/02/2023	17.0	26.3	11	26	83	Waning Crescent (35% illuminated)
				16/02/2023	12.8	28.7	0	26	79	Waning Crescent (24% illuminated)
				17/02/2023	14.6	28.9	0	26	82	Waning Crescent (15% illuminated)

TABLE D 3 – CALL-PLAYBACK (GLIDERS AND OWLS) AND SPOTLIGHTING

Target species	Date	Temperature (°C)		Rainfall (mm)	Max wind speed (km/h)	Relative humidity (%)
		Min.	Max.			
<i>Petauroides volans</i> (Greater Glider)	28/11/2022	13.7	22.8	0	31	55
<i>Petaurus norfolcensis</i> (Squirrel Glider)	29/11/2022	11.9	25.2	0	33	40
<i>Petaurus australis australis</i> (Yellow-bellied Glider)	30/11/2022	10.9	22.3	0	26	55
<i>Ninox connivens</i> (Barking Owl)	01/12/2022	12.6	21.6	0	24	56
<i>Tyto novaehollandiae</i> (Masked Owl)	16/05/2023	8.5	21.9	0	19	No data.
<i>Ninox strenua</i> (Powerful Owl)	22/05/2023	2.9	20.7	0	No data.	No data.
<i>Tyto tenebricosa</i> (Sooty Owl)	23/05/2023	1.4	21.3	0	13	No data.
<i>Ninox connivens</i> (Barking Owl)	18/07/2024	6.5	19.1	0	6 NW	45
<i>Tyto novaehollandiae</i> (Masked Owl)	22/07/2024	2.0	19.4	0	15	77
<i>Ninox strenua</i> (Powerful Owl)	23/07/2024	1.9	20.1	0	15	77
<i>Tyto tenebricosa</i> (Sooty Owl)	24/07/2024	1.4	20.4	0	24	70

TABLE D 4 –BIRD SURVEY WEATHER CONDITIONS

Target species	Date	Temperature (°C)		Rainfall (mm)	Max wind speed (km/h)	Relative humidity (%)
		Min.	Max.			
<i>Stictonetta naevosa</i> (Freckled Duck)	14/02/2023	18.8	22.5	No data	No data	No data
<i>Rostratula australis</i> (Painted Snipe)						
<i>Pycnoptilus floccosus</i> (Pilot Bird)						
<i>Botaurus poiciloptilus</i> (Australasian Bittern)						
<i>Limosa lapponica baueri</i> (Bar-tailed Godwit)						
<i>Ephippiorhynchus asiaticus</i> (Black-necked Stork)						
<i>Burhinus grallarius</i> (Bush Stone-curlew)						
<i>Calidris ferruginea</i> (Curlew Sandpiper)						

Target species	Date	Temperature (°C)		Rainfall (mm)	Max wind speed (km/h)	Relative humidity (%)
		Min.	Max.			
<i>Artamus cyanopterus cyanopterus</i> (Dusky Woodswallow) <i>Numenius madagascariensis</i> (Eastern Curlew) <i>Pandion cristatus</i> (Eastern Osprey) <i>Callocephalon fimbriatum</i> (Gang-gang Cockatoo) <i>Calyptorhynchus lathami lathami</i> (Glossy Black-Cockatoo) <i>Charadrius leschenaultia</i> (Greater Sand-Plover) <i>Falco hypoleucos</i> (Grey Falcon) <i>Hieraaetus morphnoides</i> (Little Eagle) <i>Glossopsitta pusilla</i> (Little Lorikeet) <i>Grantiella picta</i> (Painted Honeyeater)	15/02/2023	17.0	26.3	No data	No data	No data
<i>Erythrotriorchis radiatus</i> (Red Goshawk) <i>Calidris canutus</i> (Red Knot) <i>Anthochaera Phrygia</i> (Regent Honeyeater) <i>Lophoictinia isura</i> (Square-tailed Kite) <i>Lathamus discolor</i> (Swift Parrot) <i>Asperula asthenes</i> (Trailing Woodruff) <i>Daphoenositta chrysoptera</i> (Varied Sittella) <i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle) <i>Hirundapus caudacutus</i> (White-throated Needletail)	16/02/2023	12.8	28.7	No data	No data	No data

TABLE D 5 – CALL-PLAYBACK AND SPOTLIGHTING WEATHER CONDITIONS (FROGS)

Target species	Start	End	Date	Temperature (°C)		Rainfall (mm)	Max wind speed (km/h)	Relative humidity (%)	Barometric pressure (hPa)	Cloud cover (oktas)	Monophase
				Min.	Max.						
<i>Heleioporus australiacus</i> (Giant Burrowing Frog) <i>Mixophyes iteratus</i> (Giant Barred Frog) <i>Litoria aurea</i> (Green and Golden Bell Frog) <i>Litoria brevipalmata</i> (Green-thighed Frog) <i>Litoria littlejohni</i> (Littlejohn’s Tree Frog) <i>Uperoleia mahonyi</i> (Mahony's Toadlet) <i>Mixophyes balbus</i> (Stuttering Frog) <i>Crinia tinnula</i> (Wallum Froglet)	28/11/2022	01/12/2022	Previous month	-	-	41.2	-	-	-	-	-
			Previous 7 days	-	-	2.8	-	-	-	-	-
			Previous 24 hours	-	-	2.8	-	-	-	-	-
			28/11/2022	13.7	22.8	0	31	55	1015.9	No data	Waxing Gibbous (66% illuminated)
			29/11/2022	11.9	25.2	0	33	40	1012.7	No data	Waxing Crescent (33% illuminated)
			30/11/2022	10.9	22.3	0	26	55	1016.8	No data	Waxing Crescent (44% illuminated)
			01/12/2022	12.6	21.6	0	24	56	1014.8	No data	First Quarter (55% illuminated)

TABLE D 6 –ACOUSTIC RECORDER WEATHER CONDITIONS

Type of recorder	Number of recorders deployed	Target species	Deployment	Collection	Date	Temperature (°C)		Rainfall (mm)	Mean wind speed (km/h)	Relative humidity (%)
						Min.	Max.			
Anabat	2	<i>Micronomus norfolkensis</i> (Eastern Coastal Free-tail Bat)	13/02/2023	17/02/2023	13/02/2023	21.7	25.4	15.4	26	No data



Type of recorder	Number of recorders deployed	Target species	Deployment	Collection	Date	Temperature (°C)		Rainfall (mm)	Mean wind speed (km/h)	Relative humidity (%)
						Min.	Max.			
		<i>Falsistrellus tasmaniensis</i> (Eastern False Pipistrelle)			14/02/2023	18.1	23.6	0.2	26	No data
		<i>Phoniscus papuensis</i> (Golden Tipped Bat)								
		<i>Scoteanax rueppellii</i> (Greater Broad-nosed Bat)			15/02/2023	17.6	29.1	11	26	No data
		<i>Pteropus poliocephalus</i> (Grey-headed Flying-fox)								
		<i>Miniopterus orianae oceanensis</i> (Large Bent-winged Bat)			16/02/2023	15.6	36.1	0	26	No data
		<i>Chalinolobus dwyeri</i> (Large-eared Pied Bat)								
		<i>Miniopterus australis</i> (Little Bentwing-bat)			17/02/2023	15.4	32.8	0	26	No data
		<i>Myotis Macropus</i> (Southern Myotis)								

TABLE D 7 – SPOTLIGHTING (REPTILES)

Target species	Start	End	Date	Temperature (°C)		Rainfall (mm)	Max wind speed km/h)	Relative humidity (%)	Moon phase
				Min.	Max.				
<i>Hoplocephalus bitorquatus</i> (Pale headed snake)	28/11/2022	01/12/2022	28/11/2022	13.7	22.8	0	31	55	Waxing Gibbous (66% illuminated)
<i>Hoplocephalus bungaroides</i> (Broad-headed Snake)			29/11/2022	11.9	25.2	0	33	40	Waxing Crescent (33% illuminated)
<i>Hoplocephalus stephensii</i> (Stephens' Banded Snake)			30/11/2022	10.9	22.3	0	26	55	Waxing Crescent (44% illuminated)
			01/12/2022	12.6	21.6	0	24	56	First Quarter (55% illuminated)

TABLE D 8 – SPOT ASSESSMENT TECHNIQUE (SAT PLOTS)

Target species	Start	End	Date	Temperature (°C)		Rainfall (mm)	Max wind speed (km/h)	Relative humidity (%)
				Min.	Max.			
<i>Phascolarctos cinereus</i> (Koala)	15/02/2023	16/02/2023	Preceding 3 days	-	-	15.6	-	-
			15/02/2023	17.0	26.3	11	No data	No data
			16/02/2023	12.8	28.7	0	No data	No data

TABLE D 9 – THREATENED FLORA TRANSECTS (5-10M TRANSECT)

Target species	Date	Temperature (°C)		Rainfall (mm)	Mean wind speed (km/h)	Relative humidity (%)
		Min.	Max.			
<i>Acacia bynoeana</i> (Bynoe's Wattle)	Preceding 3 months	-	-	139	-	-
<i>Angophora inopina</i> (Charmhaven Apple)	11/10/2023	14.0	24.3	0	11	69
<i>Asperula asthenes</i> (Trailing Woodruff)	12/10/2023	8.6	33.2	0	9.5	49
<i>Caladenia tessellate</i> (Thick-Lip Spider Orchid)						
<i>Corunastylis insignis</i> (Variable Midge Orchid)						
<i>Corunastylis sp. Charmhaven</i> (Charmhaven)						
<i>Isotoma fluviatilis subsp. fluviatilis</i> (Presumed Extinct)						
<i>Melaleuca biconvexa</i> (Biconvex Paperbark)						
<i>Melaleuca groveana</i>						
<i>Persoonia hirsuta</i> (Hairy Geebung)						
<i>Pomaderris brunnea</i> (Brown Pomaderris)						
<i>Prostanthera askania</i> (Tranquillity Mintbush)						
<i>Pterostylis gibbosa</i> (Illawarra Greenhood)						
<i>Rhizanthella slateri</i> (Eastern Underground Orchid)						
<i>Rhodamnia rubescens</i> (Scrub Turpentine)						
<i>Rhodomyrtus psidioides</i> (Native Guava)						



Target species	Date	Temperature (°C)		Rainfall (mm)	Mean wind speed (km/h)	Relative humidity (%)
		Min.	Max.			
<i>Rutidosia heterogama</i> (Heath Wrinklewren) <i>Tetratheca glandulosa</i> (Tetratheca glandulosa) <i>Tetratheca juncea</i> (Black-eyed Susan) <i>Thelymitra adorata</i> (Wyong Sun Orchid) <i>Cynanchum elegans</i> (White-flowered Wax Plant) <i>Genoplesium insigne</i> (Variable Midge Orchid) <i>Grevillea parviflora subsp. parviflora</i> (Small-flowered Grevillea)						
<i>Corunastylis insignis</i> (Variable Midge Orchid) <i>Diuris praecox</i> (Rough Doubletail) <i>Eucalyptus Camfieldii</i> (Camfield's Stringybark) <i>Eucalyptus parramattensis subsp. decadens</i> (Earp's Gum) <i>Eucalyptus parramattensis subsp. parramattensis</i> (Paramatta Red Gum) <i>Euphrasia arguta</i> (Eyebrights) <i>Maundia triglochinosides</i> <i>Thesium australe</i> (Austral Toadflax)	Preceding 3 months	-	-	191	-	-
	13/02/2023	20.2	25.9	15.4	26	No data
	14/02/2023	18.8	22.5	0.2	No data	No data
<i>Persicaria elatior</i> (Tall Knotweed) <i>Syzygium paniculatum</i> (Magenta Lilly Pilly)	Preceding 3 months	-	-	303.6	-	-
	16/05/2023	8.5	21.9	0	No data	No data
	23/05/2023	1.4	20.7	0	No data	No data
<i>Corybas dowlingii</i> (Red Helmet Orchid)	Preceding 3 months	-	-	240.4	-	-
	22/06/2023	2.9	17.9	0	No data	No data



Appendix E – Biodiversity credit report



BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00050633/BAAS17065/24/00050634	Cooranbong Stockpile Expansion	14/03/2024
Assessor Name	Assessor Number	BAM Data version *
Arne Henry Bishop	BAAS17065	67
Proponent Names	Report Created	BAM Case Status
	21/08/2024	Open
Assessment Revision	Assessment Type	Date Finalised
0	Part 4 Developments (Small Area)	To be finalised
BOS entry trigger	* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.	
BOS Threshold: Area clearing threshold		

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		
Species		
Lathamus discolor / Swift Parrot		

Additional Information for Approval

Assessment Id
00050633/BAAS17065/24/00050634

Proposal Name
Cooranbong Stockpile Expansion

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BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00050633/BAAS17065/24/00050634	Cooranbong Stockpile Expansion	14/03/2024
Assessor Name	Assessor Number	BAM Data version *
Arne Henry Bishop	BAAS17065	Current classification (live - default) (67)
Proponent Names	Report Created	BAM Case Status
	02/12/2024	Open
Assessment Revision	BOS entry trigger	Assessment Type
0	BOS Threshold: Area clearing threshold	Part 4 Developments (Small Area)
Date Finalised	* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.	
To be finalised		

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		
Species		
Lathamus discolor / Swift Parrot		

Additional Information for Approval

Assessment Id	Proposal Name	Page 1 of 4
00050633/BAAS17065/24/00050634	Cooranbong Stockpile Expansion	





BAM Biodiversity Credit Report (Like for like)

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT

No Changes

Predicted Threatened Species Not On Site

Name

No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
3583-Hunter Coast Lowland Scribbly Gum Forest	Not a TEC	3.0	84	0	84

Assessment Id

00050633/BAAS17065/24/00050634

Proposal Name

Cooranbong Stockpile Expansion

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BAM Biodiversity Credit Report (Like for like)

3583-Hunter Coast Lowland Scribbly Gum Forest	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Sydney Coastal Dry Sclerophyll Forests This includes PCT's: 3583, 3592, 3594	Sydney Coastal Dry Sclerophyll Forests >=50% and <70%	3583_High	Yes	84	Wyong, Hunter, Pittwater and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Calyptorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo	3583_High	3.0	96.00
Grevillea parviflora subsp. parviflora / Small-flower Grevillea	3583_High	3.0	96.00
Lathamus discolor / Swift Parrot	3583_High	1.1	54.00
Petaurus norfolcensis / Squirrel Glider	3583_High	3.0	96.00
Tetradlea juncea / Black-eyed Susan	3583_High	3.0	96.00
Tyto novaehollandiae / Masked Owl	3583_High	3.0	96.00

Credit Retirement Options

Like-for-like credit retirement options





BAM Biodiversity Credit Report (Like for like)

Calyptrorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo	Spp	IBRA subregion
	Calyptrorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo	Any in NSW
Grevillea parviflora subsp. parviflora / Small-flower Grevillea	Spp	IBRA subregion
	Grevillea parviflora subsp. parviflora / Small-flower Grevillea	Any in NSW
Lathamus discolor / Swift Parrot	Spp	IBRA subregion
	Lathamus discolor / Swift Parrot	Any in NSW
Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW
Tetratheca juncea / Black-eyed Susan	Spp	IBRA subregion
	Tetratheca juncea / Black-eyed Susan	Any in NSW
Tyto novaehollandiae / Masked Owl	Spp	IBRA subregion
	Tyto novaehollandiae / Masked Owl	Any in NSW



EcoResolve



Environment & Design

Cooranbong Entry Site Stockpile Extension Project

Likelihood of occurrence analysis and assessment of the
significance of potential impacts on Matters of National
Environmental Significance

Executive Summary

This report assesses the potential significance of the impacts of extending the existing coal stockpile at the Northern Coal Services Cooranbong Entry Site ('the proposed action') on Matters of National Environmental Significance (MNES) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). A self-assessment process determined if any MNES likely or known to occur within the proposed action area was likely to be significantly impacted by the proposed action. The assessment process considered both desktop and field survey results. Assessments of Significance (AoS) for MNES likely to be impacted were undertaken in accordance with the Significant Impact Guidelines 1.1 for MNES (DEWHA, 2013).

The proposed action is likely to have a significant impact upon two (2) MNES species, *Grevillea parviflora subsp. parviflora* (Small Flowered Grevillea), and *Tetraloche juncea* (Black-eyed Susan), and may potentially impact a further nine (9) MNES species, including four (4) orchid species: *Corunastylis insignis* (syn. *Genoplesium insigne*) (Variable Midge Orchid), *Corunastylis sp.* Charmhaven (syn. *Genoplesium branwhiteorum*), *Rhizanthella slateri* (Eastern Underground Orchid), and *Thelymitra adorata* (Wyong Sun Orchid), and five (5) fauna species: *Calyptorhynchus lathami* (Glossy Black-Cockatoo), *Petaurus australis* (Yellow-bellied Glider), *Pteropus poliocephalus* (Grey-headed Flying Fox), *Lathamus discolor* (Swift Parrot), and *Phascolarctos cinereus* (Koala) (**Attachment 2**).

This report forms part of biodiversity impact assessments prepared for Northern Coal Services Pty Ltd (Northern Coal Services Pty Ltd) for the proposed stockpile extension at the Cooranbong Entry Site. This report and associated works (desktop assessment and field surveys) were conducted by EcoResolve Pty Ltd (EcoResolve) during 2022–2023. EcoResolve has assessed an area of ~12 ha surrounding the existing Cooranbong Entry Site and the proposed action area. The size and extent of the impact footprint of the proposed action is up to 2.97 ha.

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1. Introduction

This report details a self-assessment process which reviews and highlights potential impacts associated with the proposed extension of the coal stockpile at the Northern Coal Services Pty Ltd (Northern Coal Services Pty Ltd) Cooranbong Entry Site (the 'proposed action') and determines whether a referral may be required under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This assessment ensures that impacts upon all Matters of National Environmental Significance (MNES) listed under the EPBC Act, including flora and fauna species and associated habitats, threatened ecological communities (TECs) and other MNES, are considered. The final size and extent of the proposed footprint is still to be refined. EcoResolve has assessed an area of ~12 ha surrounding the existing Cooranbong Entry Site and the proposed action area. The size and extent of the impact footprint of the proposed action is up to 2.97 ha.

2. Methodology

The methodology was comprised of three stages of desktop assessments which were refined with field observations and targeted survey results.

1.1 Desktop Assessment

Stage 1 of the desktop assessment determined the Likelihood of Occurrence (LoO) of MNES within the proposed action area (**Attachment 1; Table 4**). It included a review of the existing desktop research previously conducted by EcoResolve, consisting of:

- A review of existing vegetation mapping, habitat mapping and reports of relevance to proposed action area and surrounding locality.
- Database searches to identify records of the threatened entities and MNES that may occur within 10 km of the proposed action area, including:
 - Office of Environment Energy and Science (EES) BioNET database.
 - Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool.
 - Use of the New South Wales (NSW) BAM Credit Calculator to generate a list of threatened species requiring specific targeted survey.
- Identify all threatened species, populations and ecological communities to be targeted during field surveys using knowledge of habitat requirements and characteristics of the proposed action area.

Additional sources of information used in the assessment included:

- Proposal layers and concept designs provided by the Northern Coal Services Pty Ltd.
- Australian Government's Species Profiles and Threats (SPRAT) database (<http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>).
- NSW EES's Threatened Species Profiles (<http://www.environment.nsw.gov.au/threatenedspeciesapp/>).
- Australia's IBRA Bioregions and sub-regions (<http://www.environment.gov.au/land/nrs/science/ibra>).
- DPI profiles of threatened species, populations, and ecological communities.
- EES Vegetation Information System (VIS) Mapping (<http://www.environment.nsw.gov.au/research/VISmap.htm>).

- NSW Biodiversity Values and Important Habitat Maps.
- Department of Planning Industry and Environment BAM (DPIE,2020).

Stage 2 refined the LoO by analysing the potential impact of the proposed action, the results of the field observations and targeted surveys (**Section 2.2**), species specific information contained in the SPRAT, including conservation advice and recovery plans, species sightings data contained in the NSW BioNet Atlas, NSW Threatened Biodiversity Profiles and vegetation data contained in the NSW BioNet VIS. The distribution and habitat requirements of each MNES were then considered to determine if a significant impact was possible (**Attachment 1; Table 5**).

Stage 3 was applied where an impact on an MNES had the potential to be significant. An Assessment of Significance (AoS) was conducted according to the Significant Impact Guidelines 1.1 for MNES (**Attachment 2**; DEWHA, 2013).

1.2 Field Survey

Field surveys were completed by EcoResolve during 2022–2023. **Attachment 3** contains a complete survey timetable and details of the survey methods applied for each species.

1.2.1 Flora Survey

Vegetation integrity surveys were undertaken in accordance with the BAM, and included:

- Review of the identification and assessment of the condition of vegetation communities, including any Threatened Ecological Communities.
- Use of BAM plots to gather specific vegetation floristics, condition and habitat feature data as per the BAM.
- Recording all survey locations and threatened flora sites with a handheld GPS..

Two (2) BAM plots were undertaken to measure the composition, structure and functional components of the site's native vegetation cover. Where possible, BAM plots were placed in a manner that best reflected the biological character of the vegetation zone being assessed (i.e., avoided placement of plots near ecotones and disturbed boundaries).

Each BAM plot included:

- One standard 20 x 20 m plot, to assess the composition and structure attributes, including trees, shrubs, grasses, forbs, ferns and other growth forms;
- One standard 20 x 50 m plot (1,000 m²) to assess the function attributes: number of large trees (i.e., > 50cm DBH), stem size class, tree regeneration, length of fallen logs, high threat exotic vegetation cover and hollow-bearing trees (HBTs); and
- Five 1 m² sub-plots to assess average litter cover for the plots.

Surveys for threatened flora were undertaken using a transect-based method with reference to 'Surveying threatened plants and their habitats - NSW survey guide for the Biodiversity Assessment Method' (DPIE 2020). Targeted flora survey timing corresponded with the prescribed survey period, as indicated by the BAM Calculator candidate species list (**Attachment 3**).

1.2.2 Fauna Surveys

Targeted surveys were conducted for species identified through the Biodiversity Opportunities and Constraints Assessment (**Attachment 3**). Fauna surveys performed used the following methods:

- Remote infrared cameras baited with tinned cat food bait and/or a rolled oat, honey and peanut butter mixture. This methodology is used in place of the now obsolete wire cage methodology.
- Spotlighting for relevant targeted nocturnal fauna species during their survey period
- Spot Assessment Technique (SAT) to assess Koala activity within the site, if suitable habitat occurs in the site.
- Placement of stationary ultrasonic bat call detection equipment in potential flyways
- Frog and reptile census will be conducted if and where suitable habitats are recorded within the site.
- Identification of fauna habitat features, and an assessment of their condition and value to threatened species.
- Incidental observations of fauna species and indirect evidence of fauna (such as scats, nests, burrows, hollows, tracks, scratches, and diggings)
- Pitfall and funnel trapping
- Taking photographs of any significant ecological values occurring within the site

All survey locations, locations of any threatened species, populations and/or ecological communities and notable habitat features were recorded with a handheld GPS.

3. Results summary

Stage 1 of the desktop assessment identified one-hundred and twenty-six (126) MNES with some potential of occurring in the locality of the proposed action, including forty-five (45) marine/migratory species and one (1) conservation dependant (CD) species (**Table 4**).

The preliminary assessment assigned a moderate or high LoO to forty-six (46) MNES including four (4) marine/migratory species (**Table 1**). These species were further assessed following field surveys and further desktop assessment of habitat constraints (**Table 5**). The refined results identified fourteen (14) MNES species to consider using the Significant Impact Guidelines (DEWHA, 2013).

The Assessments of Significance concluded that the proposed action is likely to have a significant impact upon two (2) MNES flora species, *Tetratheca juncea* (Black-eyed Susan) and *Grevillea parviflora subsp. parviflora* (Small-flowered Grevillea).

The proposed action may potentially impact a further nine (9) MNES species, including four (4) orchid species: *Corunastylis insignis* (syn. *Genoplesium insigne*) (Variable Midge Orchid), *Corunastylis sp.* Charmhaven (syn. *Genoplesium branwhiteorum*), *Rhizanthella slateri* (Eastern Underground Orchid), and *Thelymitra adorata* (Wyang Sun Orchid), and five (5) fauna species: *Calyptorhynchus lathami lathami* (Glossy Black-Cockatoo), *Petaurus australis* (Yellow-bellied Glider), *Pteropus poliocephalus* (Grey-headed Flying Fox), *Lathamus discolor* (Swift Parrot), and *Phascolarctos cinereus* (Koala) (**Attachment 2**).

Refinement to the original project design and footprint has been applied to avoid and mitigate some of the impacts anticipated. Subsequently, the significance of impacts has been reduced slightly, however change in the likelihood of a significant impact upon many of the affected species has not changed.

Table 1. Summary of significant impact assessment for MNES and Marine species.

Scientific Name	Common Name	EPBC Act	Significant impacts possible?	Significant impacts likely?
<i>Acacia bynoeana</i>	Bynoe's Wattle	V	No	No
<i>Actitis hypoleucos</i>	Common Sandpiper	MAR, MIG	Not assessed - presence unlikely	No
<i>Angophora inopina</i>	Charmhaven Apple	V	No	No
<i>Anous stolidus</i>	Common Noddy	MAR, MIG	Not assessed - presence unlikely	No
<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	No	No
<i>Apus pacificus</i>	Fork-tailed Swift	MAR, MIG	No	No
<i>Ardenna grisea</i>	Sooty Shearwater	MAR, MIG	Not assessed - presence unlikely	No
<i>Arenaria interpres</i>	Ruddy Turnstone	V, MIG	Not assessed - presence unlikely	No
<i>Asperula asthenes</i>	Trailing Woodruff	V	No	No
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	Not assessed - presence unlikely	No
<i>Caladenia tessellata</i>	Thick-lip Spider Orchid	V	No	No
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	MAR, MIG	Not assessed - presence unlikely	No
<i>Calidris canutus</i>	Red Knot	E	Not assessed - presence unlikely	No
<i>Calidris ferugiana</i>	Curlew Sandpiper	CE, MAR, MIG	Not assessed - presence unlikely	No
<i>Calidris melanotos</i>	Pectoral Sandpiper	MAR, MIG	Not assessed - presence unlikely	No
<i>Calidris ruficollis</i>	Red-necked Stint	MIG	Not assessed - presence unlikely	No
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	E	No	No
<i>Calonectris leucomelas</i>	Streaked Shearwater	MAR, MIG	Not assessed - presence unlikely	No
<i>Calyptorhynchus lathami lathami</i>	Glossy Black-Cockatoo	V	Yes	Potential
<i>Carcharodon carcharias</i>	Great White Shark	V	Not assessed - presence unlikely	No
<i>Caretta caretta</i>	Loggerhead Turtle	E	Not assessed - presence unlikely	No
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	No	No
<i>Charadrius leschenaultii</i>	Greater Sand Plover	V	Not assessed - presence unlikely	No
<i>Charadrius veredus</i>	Oriental Plover	MAR, MIG	Not assessed - presence unlikely	No
<i>Chelonia mydas</i>	Green Turtle	V	Not assessed - presence unlikely	No
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V	Not assessed - presence unlikely	No



Scientific Name	Common Name	EPBC Act	Significant impacts possible?	Significant impacts likely?
<i>Corunastylis insignis</i>	Variable Midge Orchid	CE	Yes	Potential
<i>Corunastylis sp. Charmhaven</i>	-	CE	Yes	Potential
<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid	V	Yes	No
<i>Cuculus optatus</i>	Oriental Cuckoo, Horsefield's Cuckoo	MAR, MIG	Not assessed - presence unlikely	No
<i>Cynanchum elegans</i>	White-flowered Wax Plant	E	No	No
<i>Dasyurus maculatus maculatus</i>	Spotted-tailed Quoll	E	No	No
<i>Dermochelys coriacea</i>	Leathery Turtle	E	Not assessed - presence unlikely	No
<i>Diomedea antipodensis</i>	Antipodean Albatross	V	Not assessed - presence unlikely	No
<i>Diomedea epomophora</i>	Southern Royal Albatross	V	Not assessed - presence unlikely	No
<i>Diomedea sanfordi</i>	Northern Royal Albatross	E	Not assessed - presence unlikely	No
<i>Diuris praecox</i>	Rough Doubletail	V	No	No
<i>Epinephelus daemeli</i>	Black Cod	V	Not assessed - presence unlikely	No
<i>Eretmochelys imbricata</i>	Hawksbill Turtle	V	Not assessed - presence unlikely	No
<i>Erythrorhynchus radiatus</i>	Red Goshawk	E	No	No
<i>Eucalyptus camfieldii</i>	Camfield's Stringybark	V	No	No
<i>Eucalyptus parramattensis subsp. decadens</i>	Earp's Gum	V	No	No
<i>Eucalyptus parramattensis subsp. parramattensis</i> – Endangered Population		EP	No	No
<i>Euphrasia arguta</i>		CE	No	No
<i>Falco hypoleucos</i>	Grey Falcon	V	No	No
<i>Fregata ariel</i>	Lesser Frigatebird	MAR, MIG	Not assessed - presence unlikely	No
<i>Fregata minor</i>	Great Frigatebird	MAR, MIG	Not assessed - presence unlikely	No
<i>Gallinago hardwickii</i>	Latham's Snipe	MAR, MIG	Not assessed - presence unlikely	No
<i>Grantiella picta</i>	Painted Honeyeater	V	Not assessed - presence unlikely	No
<i>Grevillea parviflora subsp. parviflora</i>	Small-flowered Grevillea	V	Yes	Yes
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	MAR	No	No
<i>Heleioporus australiacus</i>	Giant Burrowing Frog	V	Not assessed - presence unlikely	No
<i>Hirundapus caudacutus</i>	White-throated Needle-tail	V, MAR, MIG	No	No



Scientific Name	Common Name	EPBC Act	Significant impacts possible?	Significant impacts likely?
<i>Hoplocephalus bungaroides</i>	Broad-headed snake	V	Not assessed - presence unlikely	No
<i>Hydroprogne caspia</i>	Caspian Tern	MIG	Not assessed - presence unlikely	No
<i>Lamna nasus</i>	Porbeagle	MIG	Not assessed - presence unlikely	No
<i>Lathamus discolor</i>	Swift Parrot	CE	Yes	Potential
<i>Limosa lapponica</i>	Bar-tailed Godwit	MAR, MIG	Not assessed - presence unlikely	No
<i>Limosa lapponica baueri</i>	Nunivak Bar-tailed Godwit	E, MIG	Not assessed - presence unlikely	No
<i>Litoria aurea</i>	Green and Golden Bell Frog	V	No	No
<i>Litoria littlejohni</i>	Littlejohn's Tree Frog	V	No	No
<i>Macronectes giganteus</i>	Southern Giant Petrel	E	Not assessed - presence unlikely	No
<i>Macronectes halli</i>	Northern Giant-petrel	V	Not assessed - presence unlikely	No
<i>Melaleuca biconvexa</i>	Biconvex Paperbark	V	No	No
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern)	E	No	No
<i>Mixophyes balbus</i>	Stuttering Frog	V	Not assessed - presence unlikely	No
<i>Mixophyes iteratus</i>	Giant Barred Frog	V	Not assessed - presence unlikely	No
<i>Monarcha melanopsis</i>	Black-faced Monarch	MAR, MIG	No	No
<i>Motacilla flava</i>	Yellow Wagtail	MAR, MIG	Not assessed - presence unlikely	No
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	MAR, MIG	Not assessed - presence unlikely	No
<i>Natator depressus</i>	Flatback Turtle	V	Not assessed - presence unlikely	No
<i>Neophema chrysostoma</i>	Blue-winged Parrot	V	Not assessed - presence unlikely	No
<i>Notamacropus parma</i>	Parma Wallaby	V	Not assessed - presence unlikely	No
<i>Numenius madagascariensis</i>	Eastern Curlew	CE	Not assessed - presence unlikely	No
<i>Numenius phaeopus</i>	Whimbrel	MIG, MAR	Not assessed - presence unlikely	No
<i>Onychoprion anaethetus</i>	Bridles Tern	MIG, MAR	Not assessed - presence unlikely	No
<i>Pachyptila turtur subantarctica</i>	Fairy Prion	V	No	No
<i>Pandion cristatus</i>	Eastern Osprey	MAR, MIG	Not assessed - presence unlikely	No
<i>Persicaria elatior</i>	Tall Knotweed	V	No	No
<i>Petauroides volans</i>	Greater Glider	E	No	No



Scientific Name	Common Name	EPBC Act	Significant impacts possible?	Significant impacts likely?
<i>Petaurus australis australis</i>	Yellow-bellied Glider	V	Yes	Potential
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	V	Not assessed - presence unlikely	No
<i>Phaethon lepturus</i>	White-tailed Tropicbird	MAR, MIG	Not assessed - presence unlikely	No
<i>Phascolarctos cinereus</i>	Koala	E	Yes	Potential
<i>Pluvialis fulva</i>	Pacific Golden Plover	MAR, MIG	Not assessed - presence unlikely	No
<i>Pomaderris brunnea</i>	Brown Pomaderris	V	Not assessed - presence unlikely	No
<i>Potorous tridactylus tridactylus</i>	Long-nosed Potoroo	V	No	No
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	V	No	No
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	Yes	Potential
<i>Pterostylis gibbosa</i>	Illawarra Greenhood	E	Not assessed - presence unlikely	No
<i>Pycnoptilus floccosus</i>	Pilot bird	V	Not assessed - presence unlikely	No
<i>Rhipidura rufifrons</i>	Rufous Fantail	MAR, MIG	Not assessed - presence unlikely	No
<i>Rhizanthella slateri</i>		E	Yes	Potential
<i>Rhodamnia rubescens</i>	Scrub Turpentine	CE	No	No
<i>Rhodomirtus psidioides</i>	Native Guava	CE	No	No
<i>Rostratula australis</i>	Australian Painted Snipe	E, MAR	No	No
<i>Rutidosis heterogama</i>	Heath Wrinklewort	V	No	No
<i>Sphyrna lewini</i>	Scalloped Hammerhead	CD	Not assessed - presence unlikely	No
<i>Stagonopleura guttata</i>	Diamond Firetail	V	No	No
<i>Stercorarius parasiticus</i>	Arctic Jaeger	MAR, MIG	Not assessed - presence unlikely	No
<i>Sterna hirundo</i>	Common Tern	MAR, MIG	Not assessed - presence unlikely	No
<i>Sternula nereis nereis</i>	Fairy Tern	V	Not assessed - presence unlikely	No
<i>Symposiachrus trivirgatus</i>	Spectacled Monarch	MAR, MIG	Not assessed - presence unlikely	No
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	V	No	No
<i>Tetratheca juncea</i>	Black-eyed Susan	V	Yes	Yes
<i>Thalassarche bulleri platei</i>	Northern Buller's Albatross	V	Not assessed - presence unlikely	No
<i>Thalassarche bulleri</i>	Pacific Albatross	V	Not assessed - presence unlikely	No
<i>Thalassarche cauta</i>	Shy Albatross	E	Not assessed - presence unlikely	No



Scientific Name	Common Name	EPBC Act	Significant impacts possible?	Significant impacts likely?
<i>Thalassarche eremita</i>	Chatham Albatross	E	Not assessed - presence unlikely	No
<i>Thalassarche impavida</i>	Campbell Albatross	V	Not assessed - presence unlikely	No
<i>Thalassarche melanophris</i>	Black-browed Albatross	V	Not assessed - presence unlikely	No
<i>Thalassarche salvini</i>	Salvin's Albatross	V	Not assessed - presence unlikely	No
<i>Thalassarche steadi</i>	White-capped Albatross	V, MAR, MIG	Not assessed - presence unlikely	No
<i>Thelymitra adorata</i>	Wyong Sun Orchid	CE	Yes	Potential
<i>Thesium australe</i>	Austral Toadflax	V	No	No
<i>Tringa brevipes</i>	Grey-tailed Tattler	MIG, MAR	Not assessed - presence unlikely	No
<i>Tringa nebularia</i>	Common Greenshank	MAR, MIG	Not assessed - presence unlikely	No
<i>Tringa stagnatilis</i>	Marsh Sandpiper	MAR, MIG	Not assessed - presence unlikely	No
<i>Uperoleia mahonyi</i>	Mahony's Toadlet	E	No	No

Note: V = Vulnerable, E = Endangered, CE = Critically Endangered, MAR = Marine, MIG = Migratory, CD = Conservation Dependant

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Attachment 1 – Likelihood of Occurrence Assessment

Stage 1 of the desktop assessment involved a preliminary 'likelihood of occurrence' (LoO) determination for threatened species identified in **Table 4**. NSW BioNet records, habitat requirements and breeding and foraging behaviour were considered in relation to the location of the proposed action. The LoO classifications in **Table 4** were assigned to each threatened species based on the criteria set out in **Table 2**.

Stage 2 involved assessing the potential for impact on moderate or high LoO species (**Table 5**). The moderate or high LoO threatened species list was then refined following field observations and further assessment of habitat constraints and the potential impact of the proposed action. The survey outcome classifications in **Table 5** were assigned to each threatened species based on the criteria set out in **Table 3**.

Table 2 Likelihood of Occurrence criteria.

Likelihood of Occurrence	Definition (species specific)
None	Habitat features within the area of interest are unsuitable for the species e.g., aquatic species within a terrestrial environment.
Low	The area of interest seldom contains suitable habitat for the species, no recent records (i.e., NSW BioNet records) occur within the area of interest.
Moderate	Important habitat features occur within the area of interest for the species. The area of interest may or may not be within the species indicative 'known or predicted mapped distribution'. Species may or may not have been detected recently within the locality i.e., within NSW BioNet records.
High	High quality habitat features specifically associated with the species generally occur within the area of interest and is within the species known distribution. Recent NSW BioNET records have recently observed the species within the location.

Table 3 Potential for impact analysis criteria.

Survey Outcomes	Definition
None	Habitat analysis only following site inspection. No targeted surveys required.
Potential	Targeted surveys performed outside guideline specifications and/or cryptic nature of the threatened species require further targeted surveys to determine the species presence or absence.
Absent	Targeted surveys performed adhering to guideline specification. No populations or individuals were identified on site.
Present	Targeted surveys performed adhering to guideline specification. Threatened species has been identified on site during field observations.

Table 4 Likelihood of Occurrence from desktop assessments on EPBC Act listed species within the area of interest (10km radius of proposed action area).

Note: V = Vulnerable, E = Endangered, CE = Critically Endangered, MAR = Marine, MIG = Migratory.

Scientific Name (Common Name)	BC Act	EPBC Act	Habitat (DPIE; DCCEW, 2023)	Number of Records (DPHI 2024)	Likelihood of Occurrence
<i>Acacia bynoeana</i> (Bynoe's Wattle)	E	V	Grows mainly in heath and dry sclerophyll forest in sandy soils. Mainly south of Dora Creek-Morisset area to Berrima and the Illawarra region, west to the Blue Mountains, also recorded from near Kurri Kurri in the Hunter Valley and from Morton National Park.	102	Moderate
<i>Actitis hypoleucos</i> (Common Sandpiper)	-	MAR, MIG	Utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats.	0	Low
<i>Angophora inopina</i> (Charmhaven Apple)	V	V	Endemic to the Central Coast region of NSW. The known northern limit is near Karuah where a disjunct population occurs; to the south populations extend from Toronto to Charmhaven with the main population occurring between Charmhaven and Morisset. Occurs most frequently in red bloodwood – scribbly gum woodland, wet heath, red mahogany – paperbark sedge woodland and stringybark – red bloodwood forest.	536	High
<i>Anous stolidus</i> (Common Noddy)	-	MAR, MIG	During the non-breeding period, the species occurs in groups throughout the pelagic zone. During the breeding season, usually occurs on or near islands, on rocky islets and stacks with precipitous cliffs, or on shoals or cays of coral or sand. When not at the nest, individuals will remain close to the nest, foraging in the surrounding waters.	0	Low
<i>Anthochaera phrygia</i> (Regent Honeyeater)	CE	CE	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. The distribution of the species has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests.	1	Moderate
<i>Apus pacificus</i> (Fork-tailed Swift)	-	MAR, MIG	The Fork-tailed Swift is almost exclusively aerial, flying from less than one metre to at least 300 metres above ground and probably much higher.	1	Moderate
<i>Ardenna grisea</i> (Sooty Shearwater)	-	MAR, MIG	In Australia, the Sooty Shearwater breeds on islands off New South Wales (NSW) and Tasmania. The species occurs off the coast of south-east Queensland in small numbers and is a moderately common migrant and visitor to Victoria and South Australia. The Sooty Shearwater is found in the southern hemisphere during summer, where the species breeds around New Zealand, southern Australia and southern South America. During winter (non-breeding season) most birds move to the North Pacific Ocean, but some move into the North Atlantic Ocean, or remain in the southern hemisphere. The Sooty Shearwater occurs in New Zealand during September to May, where it is common along both the east and west coasts. On the mainland, the species breeds on headlands and islands, as far north as Three Kings Island. Further offshore it breeds on Chatham, Antipodes and Auckland Islands. During the southern hemisphere summer, the species ranges from breeding islands south to Antarctic waters (as far as the iceberg-belt), although some remain in northern hemisphere.	0	Low
<i>Ardenna tenuirostris</i> (Short-tailed Shearwater)	-	MAR, MIG	<i>Ardenna tenuirostris</i> is an abundant seabird species in Australian waters, which migrate to the seas off the Aleutian Islands and Kamchatka in the Australian winter. In the austral spring, they migrate down the coast of California before crossing the Pacific back to Australia.	2	Low
<i>Arenaria interpres</i> (Ruddy Turnstone)	-	V, MIG	In Australasia, the Ruddy Turnstone is mainly found on coastal regions with exposed rock coast lines or coral reefs. It also lives near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches. It can, however, be found on sand, coral or shell beaches, shoals, cays and dry ridges of sand or coral. It has occasionally been sighted in estuaries, harbours, bays and coastal lagoons, among low saltmarsh or on exposed beds of seagrass, around sewage ponds and on mudflats. In north Australia it is known to occur in a wide variety of habitats and may prefer wide mudflats. Surveys have demonstrated that the Ruddy Turnstone can live away from coastal areas in habitats such riverbeds, and on inland lakes and adjacent farmland (Higgins & Davies 1996).	0	Low
<i>Asperula asthenes</i> (Trailing Woodruff)	V	V	This small herb occurs only in NSW. It is found in scattered locations from Bulahdelah north to near Kempsey, with several records from the Port Stephens-Wallis Lakes area. Damp sites, often along riverbanks.	1	Moderate
<i>Botaurus poiciloptilus</i> (Australasian Bittern)	E	E	The Australasian Bittern is widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes and spike rushes.	0	Low
<i>Caladenia tessellata</i> (Thick-lip Spider Orchid)	E	V	The Tessellated Spider Orchid is found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. Known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW. Populations in Kiama and Queanbeyan are presumed extinct.	1	High
<i>Calidris acuminata</i> (Sharp-tailed Sandpiper)	-	MAR, MIG	Freshwater or saltwater wetlands- the muddy edges of lagoons, swamps, lakes, dams, soaks, sewage dams or temporary floodwaters.	0	Low
<i>Calidris canutus</i> (Red Knot)	-	E	The Red Knot is common in all the main suitable habitats around the coast of Australia. Very large numbers are regularly recorded in north-west Australia, with 40 Mile Beach and Roebuck Bay being strongholds. The only places it is not found in significant numbers are the northern part of the Great Australian Bight in South Australia and Western Australia, and along much of the NSW coast, where wader habitat is rather scarce (excluding the Hunter Estuary). It is widespread along the coast south of Townsville and along the coasts of NSW and Victoria. In Australasia the Red Knot mainly inhabit intertidal mudflats, sandflats, and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools, and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. They rarely use inland lakes or swamps.	0	Low



Scientific Name (Common Name)	BC Act	EPBC Act	Habitat (DPIE; DCCEEW, 2023)	Number of Records (DPHI 2024)	Likelihood of Occurrence
<i>Calidris ferruginea</i> (Curlew Sandpiper)	E	CE, MAR, MIG	The Curlew Sandpiper is distributed around most of the coastline of Australia. It occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes the inland	0	Low
<i>Calidris melanotos</i> (Pectoral Sandpiper)	-	MAR, MIG	Tends to live and feed over shallow coastal waters- the estuaries, lagoons and channels around river and harbour entrances and along the shallows close in shore.	0	Low
<i>Calidris ruficollis</i> (Red-necked Stint)	-	M	Mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores. Occasionally they have been recorded on exposed or ocean beaches, and sometimes on stony or rocky shores, reefs or shoals. They also occur in saltworks and sewage farms; saltmarsh; ephemeral or permanent shallow wetlands near the coast or inland, including lagoons, lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks and pools in saltflats. They sometimes use flooded paddocks or damp grasslands. They have occasionally been recorded on dry gibber plains, with little or no perennial vegetation	0	Low
<i>Callocephalon fimbriatum</i> (Gang-gang Cockatoo)	V	E	In summer, occupies tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. Also occur in subalpine snow gum woodland and occasionally in temperate or regenerating forest. In winter, occurs at lower altitudes in drier, more open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas. It requires tree hollows in which to breed.	1	High
<i>Calonectris leucomelas</i> (Streaked Shearwater)	-	MAR, MIG	Recorded in tropical waters from Broome across Cape York; and SE QLD to southern NSW.	0	Low
<i>Calyptorhynchus lathami lathami</i> (Glossy Black-Cockatoo)	V	V	Inhabits forest with low nutrients, characteristically with key <i>Allocasuarina</i> spp. Tends to prefer drier forest types with a middle stratum of <i>Allocasuarina</i> below <i>Eucalyptus</i> or <i>Angophora</i> . Often confined to remnant patches in hills and gullies. Breed in hollows stumps or limbs, either living or dead.	23	Known
<i>Carcharodon carcharias</i> (Great White Shark)	-	V	Found in coastal waters around Australia, South Africa, California and northeastern USA. The great white can swim at the surface, as well as more than 250m deep.	0	None
<i>Caretta caretta</i> (Loggerhead Turtle)	E	E	Loggerhead turtles have a worldwide tropical and subtropical distribution. In Australia, they occur in coral reefs, bays and estuaries in tropical and warm temperate waters off the coast of Queensland, Northern Territory, Western Australia and New South Wales.	2	Low
<i>Chalinolobus dwyeri</i> (Large-eared Pied Bat)	V	V	Located in a variety of drier habitats, including the dry sclerophyll forests and woodlands to the east and west of the Great Dividing Range. Can also be found on the edges of rainforests and in wet sclerophyll forests. This species roosts in caves and mines in groups of between 3 and 37 individuals.	1	Moderate
<i>Charadrius leschenaultia</i> (Greater Sand Plover)	V	V	Primarily found in coastal areas of NSW, this species inhabits sheltered sandy, shelly, or muddy beaches and estuaries with extensive intertidal mudflats or sandbanks. During high tide, they roost on sandy beaches and rocky shores, and begin foraging on wet ground at low tide, typically away from the water's edge. They may forage and roost alongside other waders. Their diet consists of insects, crustaceans, polychaete worms, and molluscs, and they locate prey by running short distances, pausing to observe, and then collecting the prey.	0	Low
<i>Charadrius veredus</i> (Oriental Plover)	-	MAR, MIG	Non-breeding visitor to Australia, occurring in both coastal and inland areas. Rarely recorded in the south east, with highest occurrences in Australia being in northern and north-western Australia. Spends a few weeks in coastal habitats before heading inland to flat grassy and semi-arid to arid grasslands.	0	Low
<i>Chelonia mydas</i> (Green Turtle)	V	V	Green turtles occur in seaweed-rich coral reefs and inshore seagrass pastures in tropical and subtropical areas of the Indo-Pacific region.	0	Low
<i>Climacteris picumnus victoriae</i> (Brown Treecreeper (eastern subspecies))	V	V	Found in eucalypt woodlands (including box-gum woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and river red gum forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains.	1	Low
<i>Corunastylis insignis</i> (Variable Midge Orchid)	CE	CE	Recorded from four localities between Chain Valley Bay and Wyong in Wyong local government area. A small population also occurs within Lake Macquarie LGA. Appears to be associated with PCT 1636 Scribbly Gum – Red Bloodwood – <i>Angophora inopina</i> (not always present) heathy woodland on lowlands of the Central Coast and variations containing <i>Angophora costata</i> (Smooth-barked Apple).	0	Moderate
<i>Corunastylis</i> sp. Charmhaven (syn. <i>Genoplesium branwhitorum</i>)	CE	CE	Currently only known from the Wyong Shire of NSW where it is restricted to a few locations in the Charmhaven, Warnervale and Tooheys Road (<i>Bushells Ridge</i>) areas. It occurs within low woodland to heathland with a shrubby understorey and ground layer. Dominants include Black She-oak (<i>Allocasuarina littoralis</i>), Prickly Tea-tree (<i>Leptospermum juniperinum</i>), Prickly-leaved Paperbark (<i>Melaleuca nodosa</i>), Narrow-leaved Bottlebrush (<i>Callistemon linearis</i>) and Zig-zag Bog-rush (<i>Schoenus brevifolius</i>).	0	Moderate
<i>Cryptostylis hunteriana</i> (Leafless Tongue-orchid)	V	V	Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by Scribbly Gum (<i>Eucalyptus sclerophylla</i>), Silvertop Ash (<i>E. sieberi</i>), Red Bloodwood (<i>Corymbia gummifera</i>) and Black Sheoak (<i>Allocasuarina littoralis</i>); appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (<i>C. subulata</i>) and the Tartan Tongue Orchid (<i>C. erecta</i>).	10	High



Scientific Name (Common Name)	BC Act	EPBC Act	Habitat (DPIE; DCCEEW, 2023)	Number of Records (DPHI 2024)	Likelihood of Occurrence
<i>Cuculus optatus</i> (Oriental Cuckoo, Horsefield's Cuckoo)	-	MAR, MIG	Occurs in a variety of environments throughout tropical and subtropical Australia extending from the Pilbara in WA to southern NSW east of the Great Dividing Range.	0	Low
<i>Cynanchum elegans</i> (White-flowered Wax Plant)	E	E	Recorded from rainforest gullies scrub and scree slopes from the Gloucester district to the Wollongong area and inland to Mt Dangar.	0	Moderate
<i>Dasyurus maculatus maculatus</i> (Spotted-tailed Quoll)	V	E	Spotted-tailed Quoll are found on the east coast of NSW, Tasmania, eastern Victoria, and north-eastern Queensland. Only in Tasmania is it still considered common. Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath, and inland riparian forest, from the sub-alpine zone to the coastline.	0	Moderate
<i>Dermochelys coriacea</i> (Leathery Turtle)	V	E	Occurs in inshore and offshore marine waters. Rarely breeds in Australia, with the nearest regular nesting sites being the Solomon Islands and Malayan Archipelago. Occasional breeding records from NSW coast, including between Ballina and Lennox Head in northern NSW.	0	Low
<i>Diomedea antipodensis</i> (Antipodean Albatross)	V	V	The species ranges across the southern Pacific Ocean, east to the coast of Chile and west to eastern Australia. The Antipodean Albatross breeds biennially in colonies on ridges, slopes and plateaus of isolated subantarctic islands, usually in vegetation such as grass tussocks. This species regularly occurs in small numbers off the NSW south coast from Green Cape to Newcastle during winter where they feed on cuttlefish.	0	Low
<i>Diomedea epomophora</i> (Southern Royal Albatross)	V	V	Breeding occurs on Adams, Enderby and Auckland Islands (Auckland Islands group), Campbell Island, and on Taiaroa Head (Otago Peninsula, South Island), New Zealand. This otherwise pelagic species is most recorded in New Zealand and South American waters in the non-breeding season, but may circumnavigate all the way around the Southern Ocean	0	Low
<i>Diomedea sanfordi</i> (Northern Royal Albatross)	E	E	Marine, subtropical to sub-Antarctic oceans; occasionally further south into the Antarctic.	0	Low
<i>Diuris praecox</i> (Rough Doubletail)	V	V	Occurs between Ourimbah and Nelson Bay. Grows on hills and slopes of near-coastal districts in open forests which have a grassy to fairly dense understorey. Exists as subterranean tubers most of the year. It produces leaves and flowering stems in winter.	0	Moderate
<i>Epinephelus daemeli</i> (Black Cod)	-	V	In Australia, the distribution of black cod ranges from southern Queensland through NSW to northern Victoria. However, records from Queensland and Victoria are rare, and the single specimen recorded from South Australian waters is considered a vagrant. The NSW coastline forms the species' main range, both in Australia and internationally. Black cod are known to occur to some degree in all six NSW Marine Parks – Lord Howe, Cape Byron, Solitary Island, Port Stephens, Jervis Bay and Batemans Bay	0	Low
<i>Eretmochelys imbricata</i> (Hawksbill Turtle)	V	V	Found mainly throughout the world's tropical oceans, predominantly in coral reefs	0	Low
<i>Erythrotriorchis radiatus</i> (Red Goshawk)	CE	E	Occurs coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia.	0	Moderate
<i>Eucalyptus camfieldii</i>	V	V	Restricted distribution in a narrow band with the most northerly records in the Raymond Terrace Area south to Waterfall. Localised and scattered distribution includes sites at Norah Head (Tuggerah Lakes), Peats Ridge, Mt Colah, Elvina Bay Trail (West Head), Terrey Hills, Killara, North Head, Menai, Wattamolla and a few other sites in Royal National Park. Poor coastal country in shallow sandy soils overlying Hawkesbury sandstone. Coastal heath mostly on exposed sandy ridges. Occurs mostly in small, scattered stands near the boundary of tall coastal heaths and low open woodland of the slightly more fertile inland areas.	0	Low
<i>Eucalyptus parramattensis</i> subsp. <i>decadens</i>	V	V	Generally, occupies deep, low-nutrient sands, often those subject to periodic inundation or where water tables are relatively high. It occurs in dry sclerophyll woodland with dry heath understorey. It also occurs as an emergent in dry or wet heathland. Often where this species occurs, it is a community dominant.	0	Moderate
<i>Eucalyptus parramattensis</i> subsp. <i>parramattensis</i> (Threatened population)	EP	EP	The population of <i>Eucalyptus parramattensis</i> subsp. <i>parramattensis</i> in Wyong and Lake Macquarie local government areas is at the north eastern limit of the range of the species and is disjunct from other known populations of the subspecies. The current population of the subspecies is estimated to be about 1300 trees in Wyong local government area and about 10 trees in Lake Macquarie local government area. The population is threatened by grazing (which may affect regeneration), localised clearing and effects of septic overflow. Planned road construction and future development may substantially reduce the population and its habitat.	4	Low
<i>Euphrasia arguta</i>	CE	CE	Occur in eucalypt forest with a mixed grass and shrub understorey within Nundle State Forest. Sites have either been logged in the last few decades or appear to have regrown from past clearing.	0	Moderate
<i>Falco hypoleucos</i> (Grey Falcon)	E	V	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey.	0	Moderate
<i>Fregata ariel</i> (Lesser Frigatebird)	-	MAR, MIG	This species occurs across tropical and subtropical waters in the Pacific and Indian Oceans, and the Atlantic coast of Brazil. In Australia this species is known from records around the coastal areas of the continent, however rarely south of Perth across to the southern extent of NSW. Frigatebirds take fish in flight from the surface of the ocean.	0	None
<i>Fregata minor</i> (Great Frigatebird)	-	MAR, MIG	A seabird with records around most of Australia's coast, predominantly concentrated to the north east of the continent. Some vagrants have been recorded inland however these are exceptional occurrences.	0	None
<i>Gallinago hardwickii</i> (Latham's Snipe)	-	MAR, MIG	Latham's Snipe is a non-breeding migrant to the southeast of Australia including Tasmania, passing through the north and New Guinea on passage. Latham's Snipe breed in Japan and on the east Asian mainland. seen in small groups or singly in freshwater wetlands on or near the coast, generally among dense cover. They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and in saltmarsh and creek edges on migration.	2	Low



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<i>Grantiella picta</i> (Painted Honeyeater)	V	V	Paddock trees are important if mistletoes are present at a density of greater than five mistletoes per hectare. The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria, and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits boree, brigalow and box-gum woodlands and box-ironbark forests.	0	Low
<i>Grevillea parviflora</i> subsp. <i>parviflora</i> (Small-flowered Grevillea)	V	V	Grows in sandy or light clay soils usually over thin shales. Occurs in a range of vegetation types from heath and shrubby woodland to open forest. Found over a range of altitudes from flat, low-lying areas to upper slopes and ridge crests. Often occurs in open, slightly disturbed sites such as along tracks.	226	Known
<i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle)	V	M	Inhabits coastal and near coastal areas, building large stick nests, and feeding mostly on marine and estuarine fish and aquatic fauna.	8	High
<i>Heleioporus australiacus</i> (Giant Burrowing Frog)	V	V	The Giant Burrowing Frog has been recorded breeding in a range of water bodies associated with more sandy environments of the coast and adjacent ranges from the Sydney Basin south the eastern Victoria. It breeds in hanging swamps, perennial non-flooding creeks and occasionally permanent pools, but permanent water must be present to allow its large tadpoles time to reach metamorphosis.	0	Low
<i>Hirundapus caudacutus</i> (White-throated Needletail)	-	V, MAR, MIG	An aerial species found in feeding concentrations over cities, hilltops, and timbered ranges.	4	Moderate
<i>Hoplocephalus bungaroides</i> (Broad-headed snake)	E	V	Occurs almost exclusively in association with communities occurring on Triassic sandstone within the Sydney Basin. Typically found among exposed sandstone outcrops with vegetation types ranging from woodland to heath. Within these habitats they spend most of the year sheltering in and under rock crevices and exfoliating rock. However, some individuals will migrate to tree hollows to find shelter during hotter parts of summer.	0	Low
<i>Hydroprogne caspia</i> (Caspian Tern)	-	M	Patrols surf line and inshore waters. Prefers sheltered estuaries, inlets, bays, harbours and lagoons with muddy or sandy shores. Also extends well inland on freshwater or saltwater lakes, temporary floodwater, large rivers, reservoirs or sewage ponds.	1	Low
<i>Lamna nasus</i> (Porbeagle)	-	M	Inhabits oceanic waters and areas around the edge of the continental shelf. They occasionally move into coastal waters, but these movements are temporary. The Porbeagle utilises a broad vertical range of the water column and is known to dive to depths exceeding 1300 m.	0	None
<i>Lathamus discolor</i> (Swift Parrot)	E	CE	The Swift Parrot occurs in woodlands and forests of NSW from May to August, where it feeds on eucalypt nectar, pollen and associated insects. The Swift Parrot is dependent on flowering resources across a wide range of habitats in its wintering grounds in NSW. This species is migratory, breeding in Tasmania and nomadic, moving about in response to changing food availability.	4	High
<i>Limosa lapponica</i> (Bar-tailed Godwit)	-	MAR, MIG	Found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. It is rarely found on inland wetlands or in areas of short grass, such as farmland, paddocks, and airstrips, although it is commonly recorded in paddocks at some locations overseas.	0	Low
<i>Limosa lapponica baueri</i> (Nunivak Bar-tailed Godwit)	-	E, MIG	Found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. It is rarely found on inland wetlands or in areas of short grass, such as farmland, paddocks and airstrips, although it is commonly recorded in paddocks at some locations overseas.	0	Low
<i>Litoria aurea</i> (Green and Golden Bell Frog)	E	V	Inhabits a very wide range of water bodies including marshes, dams and streams, particularly those containing emergent vegetation such as bullrushes or spike rushes. It also inhabits numerous types of man-made water bodies including quarries and sand extraction sites. Optimum habitat includes waterbodies that are un-shaded, free of predatory fish such as Plague Minnow, have a grassy area nearby and diurnal sheltering sites available.	179	Moderate
<i>Litoria littlejohni</i> (Littlejohn's Tree Frog)	V	V	Occurs in wet and dry sclerophyll forests and heathland associated with sandstone outcrops between 240 and 1000 m on the eastern slopes of the Great Dividing Range from the Central Coast down into Victoria. Individuals have been collected from a wide range of water bodies that includes semi-permanent dams, permanent ponds, temporary pools and permanent streams, with calling occurring from fringing vegetation or on the banks. Individuals have been observed sheltering under rocks on high exposed ridges during summer and within deep leaf litter adjacent to the breeding site. Calling occurs in all months of the year, often in association with heavy rains. The tadpoles are distinctive, being large and very dark in colouration.	0	Moderate
<i>Macronectes giganteus</i> (Southern Giant Petrel)	E	E	The Southern Giant Petrel has a circumpolar pelagic range from Antarctica to approximately 20°S and is a common visitor off the coast of NSW. Over summer, the species nests in small colonies amongst open vegetation on antarctic and subantarctic islands, including Macquarie and Heard Islands and in Australian Antarctic territory.	0	Low
<i>Macronectes halli</i> (Northern Giant-petrel)	V	V	Breeding in Australian territory is limited to Macquarie Island and occurs during spring and summer.	0	Low
<i>Melaleuca biconvexa</i> (Biconvex Paperbark)	V	V	Grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects. Scattered and dispersed populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north.	161	Moderate
<i>Melanodryas cucullata</i> (Hooded Robin (south-eastern))	V	E	Occupy a wide range of eucalypt woodlands, Acacia shrublands and open forests.	0	Moderate



Scientific Name (Common Name)	BC Act	EPBC Act	Habitat (DPIE; DCCEEW, 2023)	Number of Records (DPHI 2024)	Likelihood of Occurrence
<i>Mixophyes balbus</i> (Stuttering Frog)	E	V	Associated with streams in dry sclerophyll and wet sclerophyll forests and rainforests of more upland areas of the Great Dividing Range of NSW and down into Victoria. Breeding occurs along forest streams with permanent water where eggs are deposited within nests excavated in riffle zones by the females and the tadpoles swim free into the stream when large enough to do so. Outside of breeding, individuals range widely across the forest floor and can be found hundreds of metres from water.	2	Low
<i>Mixophyes iteratus</i> (Giant Barred Frog)	E	V	This species is found along larger streams of the coast and adjacent ranges of NSW and SE QLD. It inhabits rainforest and wet sclerophyll forest but is also found within cleared farmland where fringing vegetation is retained, including lantana beds. Many sites where the Giant Barred Frog is known to occur are the lower reaches of streams which have been affected by major disturbances such as clearing, timber harvesting and urban development in their headwaters.	11	Low
<i>Mobula alfredi</i> (Manta Ray)	-	MIG	Occurring from the NSW south coast north up the Queensland Coast, around Cap York peninsula, north from Exmouth in WA. Manta rays frequently inhabit relatively shallow waters near coastal reefs of both continents and islands. Threatened by fisheries and climate change. (MantaTrust, 2024; Australian Museum, 2024)	0	None
<i>Mobula birostris</i> (Giant Oceanic Ray)	-	MIG	This species is distributed across the tropical and subtropical regions, spending most of their time in the open ocean away from reefs, and frequently diving deep to seek zooplankton. Current threats include climate change impacts to food resources, fisheries, and targeted harvesting of gill plates (MantaTrust.org, 2024).	0	None
<i>Monarcha melanopsis</i> (Black-faced Monarch)	-	MAR, MIG	The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest, but also in open eucalypt. Specific locations where breeding has been recorded includes: the Atherton Region in Queensland (wet tropics) - Julatten south to the Paluma Range and inland to the Atherton Tableland and from 26° S in south-eastern Queensland to near Lakes Entrance, Victoria. The Black-faced Monarch breeds in rainforest habitat, and generally nests near the top of trees with large leaves, in the tops of small saplings, or in lower shrubs.	0	Moderate
<i>Motacilla flava</i> (Yellow Wagtail)	-	MAR, MIG	This species has an extremely large range, extending from Europe, east through Siberia to west Asia and northwestern China, and south through the Arabian Peninsula to Egypt. This species occupies a range of damp or wet habitats with low vegetation, from damp meadows, marshes, waterside pastures, sewage farms and bogs to damp steppe and grassy tundra. In the north of its range, it is also found in large forest clearings. It breeds from April to August, although this varies with latitude.	0	Low
<i>Myiagra cyanoleuca</i> (Satin Flycatcher)	-	MAR, MIG	The Satin Flycatcher is found along the east coast of Australia from far northern Queensland to Tasmania, including south-eastern South Australia. Found in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests.	0	Low
<i>Natator depressus</i> (Flatback Turtle)	V	V	Found only in the waters around Australia, Papua New Guinea and Timor, hence it is also known as the Australian flatback.	0	Low
<i>Neophema chrysostoma</i> (Blue-winged Parrot)	-	V	The blue-winged parrot is found across southeastern Australia. In eastern South Australia, it is found north to the Flinders Ranges, and across Victoria. It is more sporadic across central and western New South Wales and into Queensland, as far north as Diamantina National Park. It lives in savannah woodland, grasslands, orchards, farmlands, marshes, heath, dunes, and other open habitats up to 1,200 m (3,937 ft) above sea level. It is one of only three species of parrot that make regular yearly migrations over a sea or ocean, with many members of the species flying between Tasmania, where they breed in spring and summer, and the mainland, where they winter. Some birds, however, do remain in Tasmania over the winter and some remain on the mainland to breed in the summer.	0	Moderate
<i>Notamacropus parma</i> (Parma Wallaby)	V	V	Once occurred from north-eastern NSW to the Bega area in the southeast. Their range is now confined to the coast and ranges of central and northern NSW from the Gosford district to the Queensland border. Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest.	0	Low
<i>Numenius madagascariensis</i> (Eastern Curlew)	-	CE	The Eastern curlew spends its breeding season in northeastern Asia, including Siberia to Kamchatka, and Mongolia. Its breeding habitat is composed of marshy and swampy wetlands and lakeshores. Most individuals winter in coastal Australia, with a few heading to South Korea, Thailand, Philippines and New Zealand, where they stay at estuaries, beaches, and salt marshes. It uses its long, decurved bill to probe for invertebrates in the mud. It may feed in solitary, but it generally congregates in large flocks to migrate or roost. Its call is a sharp, clear whistle, cuuue-reee, often repeated.	0	Low
<i>Numenius phaeopus</i> (Whimbrel)	-	M, MAR	Intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries and river deltas, often those with mangroves, but also open, unvegetated mudflats. Roosts in mangroves and other structures flooded at high tide.	0	Low
<i>Onychoprion anaethetus</i> (Bridled Tern)	-	MIG, MAR	Bridled Terns are widespread throughout Australia, breeding on offshore islands in western, northern and north-eastern Australia, extending from Cape Leeuwin in the south-west, around northern Australia to north-eastern and mid-eastern Queensland, extending through the Great Barrier Reef and Coral Sea as far south as Lady Elliott Island. Has been known to breed with other offshore birds in South Australia, and on the mainland in south Western Australia. Forages in offshore, continental shelf waters in tropical and sub-tropical seas, and is only rarely recorded along mainland coasts. This species breeds on islands, including vegetated coral cays, rocky continental islands and rock stacks and are only rarely found in inshore continental waters and along mainland coastlines.	0	None
<i>Pachyptila turtur subantarctica</i> (Fairy Prion)	V	V	The fairy prion is found throughout oceans and coastal areas in the Southern Hemisphere. Their colonies can be found on Chatham, Snares and Antipodes Islands of New Zealand, Bass Strait Islands of Australia, Falkland Islands, Marion Island, the Crozet Islands and Macquarie Island. Outside of the breeding season, the fairy prion is most often found feeding over deep waters, far from shore. During stormy weather it may come towards coastal habitats. It breeds on oceanic islands, where it nests in crevices on cliffs and rock falls or in burrows in soil, although it may also nest in scrub, herb lands, tussock, or pasture. The diet consists mainly of planktonic crustaceans and other tiny sea animals, which they feed at night from the water's surface.	0	Moderate
<i>Pandion cristatus</i> (Eastern Osprey)	V	MIG, MAR	Eastern Ospreys are found right around the Australian coastline, except for Victoria and Tasmania. They are common around the northern coast, especially on rocky shorelines, islands and reefs. The species is uncommon to rare or absent from closely settled parts of south-eastern Australia. There are a handful of records from inland areas. Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.	14	Low
<i>Persicaria elatior</i> (Tall Knotweed)	V	V	This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	1	Moderate



Scientific Name (Common Name)	BC Act	EPBC Act	Habitat (DPIE; DCCEEW, 2023)	Number of Records (DPHI 2024)	Likelihood of Occurrence
<i>Petauroides volans</i> (Greater Glider)	-	E	Occurs in eucalypt forests and woodlands. Utilise tree hollows.	0	Moderate
<i>Petaurus australis australis</i> (Yellow-bellied Glider)	V	V	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria.	10	High
<i>Petrogale penicillata</i> (Brush-tailed Rock-wallaby)	E	V	Found in rocky areas in a wide variety of habitats including rainforest gullies, wet and dry sclerophyll forest, open woodland and rocky outcrops in semi-arid country. Commonly sites have a northerly aspect with numerous ledges, caves and crevices.	2	Low
<i>Phaethon lepturus</i> (White-tailed Tropicbird)	-	MAR, MIG	The white-tailed tropicbird (Christmas Island) is endemic to Christmas Island, which is its only known breeding location. It is widely distributed across the island (Christmas Island National Park, 2013) and roosts and forages over the Indian Ocean. Both adults and juveniles appear to disperse widely and have been recorded south and south-east of Christmas Island (Marchant & Higgins, 1990). The subspecies mostly occurs north of 14°S, but may occur up to about 1500 km from Christmas Island, at the edge of the continental shelf off Western Australia at 21°S.	0	Low
<i>Phascolarctos cinereus</i> (Koala)	E	E	Inhabits eucalypt forests and woodlands. The suitability of these forests for habitation depends on the size and species of trees present, soil nutrients, climate and rainfall.	24	High
<i>Pluvialis fulva</i> (Pacific Golden Plover)	-	MAR, MIG	Mainly coastal habitats; usually in small parties or quite large flocks on estuaries, intertidal mudflats, beaches, reefs, saltmarshes and offshore islands; only rarely far inland.	0	Low
<i>Pluvialis squatarola</i> (Grey Plover)	-	M, MAR, V	In Australia, Grey Plovers occur almost entirely in coastal areas, where they usually inhabit sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. They also occur around terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes. The species is also very occasionally recorded further inland, where they occur around wetlands or salt-lakes.	3	Low
<i>Pomaderris brunnea</i> (Brown Pomaderris)	V	V	The species is expected to live for 10 - 20 years, while the minimum time to produce seed is estimated to be 4 - 6 years. Found in a very limited area around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area. It also occurs at Walcha on the New England Tableland and in far eastern Gippsland in Victoria.	0	Low
<i>Potorous tridactylus tridactylus</i> (Long-nosed Potoroo)	V	V	Inhabits coastal heath and wet and dry sclerophyll forests. Generally found in areas with rainfall greater than 760 mm. Requires relatively thick ground cover where the soil is light and sandy.	0	Moderate
<i>Pseudomys novaehollandiae</i> (New Holland Mouse)	-	V	The New Holland Mouse currently has a disjunct, fragmented distribution across Tasmania, Victoria, New South Wales, and Queensland. Across the species' range the New Holland Mouse is known to inhabit open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes.	0	Moderate
<i>Pteropus poliocephalus</i> (Grey-headed Flying-fox)	V	V	This species is a canopy-feeding frugivore and nectarivore of rainforests, open forests, woodlands, melaleuca swamps and banksia woodlands. Bats commute daily to foraging areas, usually within 15 km of the day roost although some individuals may travel up to 70 km.	68	High
<i>Pterostylis gibbosa</i> (Illawarra Greenhood)	E	E	Grows in open forest or woodland, on flat or gently sloping land with poor drainage. Known from a small number of populations in the Hunter region (Milbrodale), the Illawarra region (Albion Park and Yallah) and the Shoalhaven region (near Nowra).	0	Low
<i>Pycnoptilus floccosus</i> (Pilot bird)	-	V	Pilotbirds are endemic to south-east Australia. Upland Pilotbirds occur above 600 m in the Brindabella Ranges in the Australian Capital Territory, and in the Snowy Mountains in New South Wales and north-east Victoria (Higgins & Peter 2002; Loyn et al. 2021). Lowland Pilotbirds occur in forests from the Blue Mountains west of Newcastle, around the wetter forests of eastern Australia, to Dandenong near Melbourne.	0	Low
<i>Rhipidura rufifrons</i> (Rufous Fantail)	-	MAR, MIG	Found along the east coast of Australia from far northern Queensland to Tasmania, including south-eastern South Australia. Inhabits tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests.	0	Low
<i>Rhizanthella slateri</i>	V, EP	E	Habitat requirements are poorly understood, and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Endangered population identified at Great Lakes.	1	Moderate
<i>Rhodamnia rubescens</i> (Scrub Turpentine)	CE	CE	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. This species is characterised as highly to extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	15	Low
<i>Rhodomyrtus psidioides</i> (Native Guava)	CE	CE	Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. This species is characterised being extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	2	Low
<i>Rostratula australis</i> (Australian Painted Snipe)	E	E, MAR	In NSW, this species has been recorded at the Paroo wetlands, Lake Cowell, Macquarie Marshes and Hexham Swamp. Most common in the Murray-Darling Basin. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds.	0	Low
<i>Rutidosia heterogama</i> (Heath Wrinklewort)	V	V	Grows in heath on sandy soils and moist areas in open forest and has been recorded along disturbed roadsides.	304	High
<i>Sphyrna lewini</i> (Scalloped hammerhead)	E	CD	Listed as Conservation Dependant, this species is coastal and semi-oceanic distributed across coastal warm-temperate and tropical seas. Generally inhabit deeper waters near the continental shelf. Threats include fisheries, shark netting, and shark fin harvesting.	0	Low



Scientific Name (Common Name)	BC Act	EPBC Act	Habitat (DPIE; DCCEEW, 2023)	Number of Records (DPHI 2024)	Likelihood of Occurrence
<i>Stagonopleura guttata</i> (Diamond Firetail)	V	V	Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season). Found in grassy eucalypt woodlands, including box-gum woodlands and snow gum woodlands. Also occurs in open forest, mallee, natural temperate grassland, and in secondary grassland derived from other communities.	0	Moderate
<i>Stercorarius parasiticus</i> (Arctic jaeger)	-	MAR, MIG	Migrant to Australia, breeding in the northern hemisphere. An oceanic bird which is known along coastal areas and also occasionally enters bays.	0	None
<i>Sterna hirundo</i> (Common Tern)	-	MAR, MIG	Non-breeding migrant to Australia, where it is widespread and common on the eastern coast south to eastern Victoria, and common on parts of the northern coast, mainly east of Darwin. In Australia, they are recorded in all marine zones, but are commonly observed in near-coastal waters, both on ocean beaches, platforms and headlands and in sheltered waters, such as bays, harbours and estuaries with muddy, sandy or rocky shores.	0	Low
<i>Sternula nereis nereis</i> (Fairy Tern)	-	V	Distribution includes the southern half of NSW coast. Fairy Terns utilises a variety of habitats including offshore, islands in estuaries or lakes, wetlands, beaches and spits.	0	Low
<i>Symposiachrus trivirgatus</i> (Spectacled Monarch)	-	MAR, MIG	Coastal north-eastern and eastern Australia, including coastal islands, from Cape York, Queensland to Port Stephens, New South Wales. Prefers thick understorey in rainforests, wet gullies, and waterside vegetation, as well as mangroves.	0	Low
<i>Syzygium paniculatum</i> (Magenta Lilly Pilly)	E	V	Found only in NSW, in a narrow, linear coastal strip from Bulahdelah to Conjola State Forest. On the south coast the species occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral rainforest. On the central coast it occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities	3	Low
<i>Tetratheca juncea</i> (Black-eyed Susan)	V	V	Confined to the northern portion of the Sydney Basin bioregion and the southern portion of the North Coast bioregion in the local government areas of Wyong, Lake Macquarie, Newcastle, Port Stephens, Great Lakes and Cessnock. It is usually found in low open forest-woodland with a mixed shrub understorey and grassy groundcover. Most populations occur on low nutrient soils associated with the Awaba Soil Landscape. Cryptic species that requires survey in September-October.	3541	Known
<i>Thalassarche bulleri platei</i> (Northern Buller's Albatross)	-	V	Marine, pelagic species that occurs in subtropical and subantarctic waters of the South Pacific Ocean. In Australia, the species occurs over inshore, offshore, and pelagic waters (Blaber 1946; Carter 1977; Rogers 1969) and off the coast of south-east Tasmania. Prefers waters of the East Australia Current where sea surface-temperatures are greater than 16.5 °C.	0	None
<i>Thalassarche bulleri</i> (Pacific Albatross)	V	V	Inhabits tropical to sub-Antarctic waters, shelf edge and pelagic, preferring warmer waters, of south seas where currents from the north make it warmer.	0	None
<i>Thalassarche cauta</i> (Shy Albatross)	V	E	Marine species occurring in subantarctic and subtropical waters, reaching the tropics in the cool Humboldt Current off South America.	0	None
<i>Thalassarche eremita</i> (Chatham Albatross)	E	E	Breeds solely on a small, precipitous rock in the Chatham Islands called 'The Pyramid', to the east of New Zealand. When not breeding, the Chatham albatross migrates across the South Pacific and can be found off the coast of Peru and Chile	0	None
<i>Thalassarche impavida</i> (Campbell Albatross)	-	V	While most of its time is spent at sea, the Campbell albatross returns to land to breed, nesting on ledges and steep slopes which are covered with short grasses, tussocks, and mud.	0	None
<i>Thalassarche melanophris</i> (Black-browed Albatross)	-	V	Uses wide range of marine habitats from inshore shallows, bays and channels to the edge of the continental shelf and beyond to pelagic ocean environs.	0	None
<i>Thalassarche salvini</i> (Salvin's Albatross)	-	V	Breeds on just a few small barren and rocky islands, and otherwise occupies the open oceans	0	None
<i>Thalassarche steadi</i> (White-capped Albatross)	-	V, MAR, MIG	Mostly observed in inshore and offshore waters over the continental shelf and less frequently in pelagic waters off the shelf break. May occasionally enter larger bays. This species breeds on a number of islands in New Zealand waters. Virtually the entire population nests in the Auckland Islands, comprising between 75,000 and 117,000 breeding pairs. A small number of pairs nest on Bollons Island in the Antipodes Islands and occasionally on The Forty-Fours in the Chatham Islands. After breeding most birds remain in Australasian waters with some adults migrating across the Indian Ocean to seas off South Africa and Namibia. In NSW waters it is probably frequently overlooked due to the difficulties of separating it from the Shy Albatross. However, it appears to be a regular visitor principally occurring between March and December (OEH, 2022).	0	None
<i>Thalasseus bergii</i> (Greater Crested Tern)	-	MIG, MAR	Common in coastal seas, breeds in colonies on beaches and islands of Australia. Occasionally found inland.	0	None
<i>Thelymitra adorata</i> (Wyong Sun Orchid)	CE	CE	Currently known from several local government areas (LGA) within the Central Coast Council region of New South Wales. These include but are not limited to the LGAs of Wyong, Warnervale and Wyongah. Also recorded in the southern portion of Lake Macquarie City Council area. Occurs from 10-40 m a.s.l. in grassy woodland or occasionally derived grassland in well-drained clay loam or shale derived soils. The vegetation type in which the majority of populations occur (including the largest colony) is a Spotted Gum – Ironbark Forest with a diverse grassy understorey and occasional scattered shrubs.	0	High
<i>Thesium australe</i> (Austral Toadflax)	V	V	Grows in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. It is also found in Tasmania and Queensland and in eastern Asia. Occurs in grassland or grassy woodland. Grows on kangaroo grass tussocks but has also been recorded within the exotic Coolatai grass.	0	Moderate
<i>Tringa brevipes</i> (Grey-tailed tattler)	-	MIG, MAR	Sheltered coasts with reefs and rock platforms or with intertidal mudflats. It can also be found at intertidal rocky, coral or stony reefs as well as platforms and islets that are exposed at low tide. It has been found around shores of rock, shingle, gravel or shells and also on intertidal mudflats in embayments, estuaries and coastal lagoons, especially fringed with mangroves.	0	Low



Scientific Name (Common Name)	BC Act	EPBC Act	Habitat (DPIE; DCCEEW, 2023)	Number of Records (DPHI 2024)	Likelihood of Occurrence
<i>Tringa nebularia</i> (Common Greenshank)	-	MAR, MIG	Habitat is diverse, both inland and coastal. Found inland on both permanent and temporary wetland - billabongs, swamps, lakes, floodplains, sewage, farms, and saltwater ponds. On the coast, it uses sheltered estuaries and bays with extensive mudflats, mangrove swamps, muddy shallows of harbours and lagoons and occasionally rocky tidal edges.	0	Low
<i>Tringa stagnatilis</i>	-	MAR, MIG	Permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, salt pans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes.	0	Low
<i>Uperoleia mahonyi</i> (Mahony's Toadlet)	E	E	Current observations indicate Mahony's Toadlet inhabits ephemeral and semi-permanent swamps and swales on the coastal fringe of its range. Known records occur in heath or wallum habitats almost exclusively associated with leached (highly nutrient impoverished) white sand. Commonly associated with acid paperbark swamps, Mahony's Toadlet also is known to occur in wallum heath, swamp mahogany-paperbark swamp forest, heath shrubland and Sydney red gum woodland. Recent studies suggest intact vegetation adjacent to and within water bodies is an important habitat feature for this species. Known records are associated with shallow ephemeral/semi-permanent water bodies with limited flow of water. Aquatic vegetation at breeding sites includes sedges (<i>Shoenoplectus spp.</i> , <i>Baumea spp.</i> And <i>Lepironia articulata</i>) and Broadleaf Cumbungi (<i>Typha orientalis</i>). Females have been recorded up to 400m from waterbodies indicating moderate dispersal distances and use of multiple habitat types. Tadpoles have been observed using leaf litter in the shallow verges of water bodies on sandy substrate. Rocks, logs and leaf litter may also be used for shelter and provide important foraging areas for invertebrate prey items.	0	Moderate

Table 5 Potential for impact analysis for Moderate or High EPBC Listed LoO species.

Scientific Name (Common Name)	EPBC Act	Survey Outcome	Potential for Significant Impact	Assessment of Significance required
<i>Acacia bynoeana</i> (Bynoe's Wattle)	V	Absent	Unlikely – The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.
<i>Angophora inopina</i> (Charmhaven Apple)	V	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.
<i>Anthochaera phrygia</i> (Regent Honeyeater)	CE	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute a population of this Critically Endangered species.	No , this species is considered unlikely to be significantly impacted.
<i>Apus pacificus</i>	MIG	Absent	Unlikely - The proposed action may remove a large area of suitable foraging habitat. Although there are records in the locality, the proposed action is unlikely to significant affect the preferred aquatic habitat and nearby perch sites for this highly mobile migratory species.	No , this species is considered unlikely to be significantly impacted.
<i>Asperula asthenes</i> (Trailing Woodruff)	V	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.
<i>Caladenia tessellata</i> (Thick-lip Spider Orchid)	V	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.
<i>Callocephalon fimbriatum</i> (Gang-gang Cockatoo)	E	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute a population of this Endangered species.	No , this species is considered unlikely to be significantly impacted.
<i>Calyptrorhynchus lathami</i> <i>lathami</i> (Glossy Black-Cockatoo)	V	Present	Likely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat and there are records in the locality that may constitute an important population.	Yes - AoS is considered necessary under the EPBC Act (i.e., Significant impact Guidelines 1.1). Refer to Attachment 2 .
<i>Chalinolobus dwyeri</i> (Large-eared Pied Bat)	V	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.
<i>Corunastylis insignis</i> (Variable Midge Orchid)	CE	Potential	Likely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat and there are records in the locality that may constitute a population of this Critically Endangered species.	Yes - AoS is considered necessary under the EPBC Act (i.e., Significant impact Guidelines 1.1). Refer to Attachment 2 .
<i>Corunastylis</i> sp. Charmhaven (syn. <i>Genoplesium</i> <i>branwhiteorum</i>)	CE	Potential	Likely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat and there are records in the locality that may constitute a population of this Critically Endangered species.	Yes - AoS is considered necessary under the EPBC Act (i.e., Significant impact Guidelines 1.1). Refer to Attachment 2 .
<i>Cryptostylis hunteriana</i> (Leafless Tongue-orchid)	V	Potential	Likely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat and there are records in the locality that may constitute an important population.	Yes - AoS is considered necessary under the EPBC Act (i.e., Significant impact Guidelines 1.1). Refer to Attachment 2 .
<i>Cynanchum elegans</i> (White-flowered Wax Plant)	E	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute a population of this Endangered species.	No , this species is considered unlikely to be significantly impacted.
<i>Dasyurus maculatus</i> <i>maculatus</i> (Spotted-tailed Quoll)	E	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute a population of this Endangered species.	No , this species is considered unlikely to be significantly impacted.
<i>Diuris praecox</i> (Rough Doubletail)	V	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.
<i>Erythrotriorchis radiatus</i> (Red Goshawk)	E	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute a population of this Endangered species.	No , this species is considered unlikely to be significantly impacted.
<i>Eucalyptus parramattensis</i> subsp. <i>decadens</i>	V	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.

Scientific Name (Common Name)	EPBC Act	Survey Outcome	Potential for Significant Impact	Assessment of Significance required
<i>Euphrasia arguta</i>	CE	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.
<i>Falcon hypoleucos</i> (Grey Falcon)	V	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.
<i>Grevillea parviflora</i> subsp. <i>parviflora</i> (Small-flowered Grevillea)	V	Present	Likely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat and there are records in the locality that may constitute an important population.	Yes - AoS is considered necessary under the EPBC Act (i.e., Significant impact Guidelines 1.1). Refer to Attachment 2 .
<i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle)	MAR	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of potential habitat. However, this species is considered unlikely to be significantly impacted by this action.	No , this species is considered unlikely to be significantly impacted.
<i>Hirundapus caudacutus</i> (White-throated Needletail)	MAR, MIG	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.
<i>Lathamus discolor</i> (Swift Parrot)	CE	Absent	Likely - The area is within the area mapped as important habitat for the species (BOAMS 2023). Therefore, the species is assumed present regardless of survey results.	Yes - AoS is considered necessary under the EPBC Act (i.e., Significant impact Guidelines 1.1). Refer to Attachment 2 .
<i>Litoria aurea</i> (Green and Golden Bell Frog)	V	Absent	Likely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat and there are records in the locality that may constitute an important population.	Yes - AoS is considered necessary under the EPBC Act (i.e., Significant impact Guidelines 1.1). Refer to Attachment 2 .
<i>Litoria littlejohni</i> (Littlejohn's Tree Frog)	V	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.
<i>Melaleuca biconvexa</i> (Biconvex Paperbark)	V	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, this conspicuous tree wasn't identified within the site during targeted surveys. Therefore, it's unlikely that there is an important population of this Vulnerable species present.	No , this species is considered unlikely to be significantly impacted.
<i>Melanodryas cucullata</i> <i>cucullata</i> (Hooded Robin (south-eastern))	E	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute a population of this Endangered species.	No , this species is considered unlikely to be significantly impacted.
<i>Monarcha melanopsis</i> (Black-faced Monarch)	MAR, MIG	Absent	Unlikely - The proposed action may remove an area of suitable foraging and roosting habitat. However, there are no records of the species in the locality, consequently, there is unlikely to be an area of important habitat for this migratory species in the locality.	No , this species is considered unlikely to be significantly impacted.
<i>Neophema chrysostoma</i> (Blue-winged Parrot)	V	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.
<i>Pachyptila turtur</i> <i>subantarctica</i> (Fairy Prion)	V	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.
<i>Persicaria elatior</i>	V	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.
<i>Petauroides volans</i> (Greater Glider)	E	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute a population of this Endangered species.	No , this species is considered unlikely to be significantly impacted.
<i>Petaurus australis australis</i> (Yellow-bellied Glider)	V	Absent	Likely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat and there are records in the locality that may constitute an important population.	Yes - AoS is considered necessary under the EPBC Act (i.e., Significant impact Guidelines 1.1). Refer to Attachment 2 .
<i>Phascolarctos cinereus</i> (Koala)	E	Absent	Likely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat and there are records in the locality that may constitute a population of this Endangered species.	Yes - AoS is considered necessary under the EPBC Act (i.e., Significant impact Guidelines 1.1). Refer to Attachment 2 .
<i>Potorous tridactylus</i> (Long-nosed Potoroo)	V	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.



Scientific Name (Common Name)	EPBC Act	Survey Outcome	Potential for Significant Impact	Assessment of Significance required
<i>Pseudomys novaehollandiae</i> (New Holland Mouse)	V	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.
<i>Pteropus poliocephalus</i> (Grey-headed Flying-fox)	V	Absent	Likely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat and there are records in the locality that may constitute an important population.	Yes - AoS is considered necessary under the EPBC Act (i.e., Significant impact Guidelines 1.1). Refer to Attachment 2 .
<i>Rhizanthella slateri</i>	E	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.
<i>Rutidosia heterogama</i> (Heath Wrinklewort)	V	Absent	Likely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat and there are records in the locality that may constitute an important population.	Yes - AoS is considered necessary under the EPBC Act (i.e., Significant impact Guidelines 1.1). Refer to Attachment 2 .
<i>Stagonopleura guttata</i> (Diamond Firetail)	V	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.
<i>Tetratheca juncea</i> (Black-eyed Susan)	V	Present	Likely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat and there are records in the locality that may constitute an important population.	Yes - AoS is considered necessary under the EPBC Act (i.e., Significant impact Guidelines 1.1). Refer to Attachment 2 .
<i>Thelymitra adorata</i> (Wyong Sun Orchid)	CE	Potential	Likely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat and there are records in the locality that may constitute a population of this Critically Endangered species.	Yes - AoS is considered necessary under the EPBC Act (i.e., Significant impact Guidelines 1.1). Refer to Attachment 2 .
<i>Thesium australe</i> (Austral Toadflax)	V	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute an important population of this Vulnerable species.	No , this species is considered unlikely to be significantly impacted.
<i>Uperoleia mahonyi</i> (Mahony's Toadlet)	E	Absent	Unlikely - The proposed action may remove a relatively small area (~3 ha) of suitable habitat. However, there are no records in the locality that may constitute a population of this Endangered species.	No , this species is considered unlikely to be significantly impacted.

Attachment 2 – Assessments of Significance (EPBC Act)

The species which have potential for significant impact by the proposed action, and therefore require consideration under the Significant Impact Guidelines 1.1 for MNES are:

Vulnerable Flora

- *Cryptostylis hunteriana* (Leafless Tongue-orchid)
- *Grevillea parviflora subsp. parviflora* (Small-flowered Grevillea)
- *Rutidosus heterogama* (Heath Wrinkelwort)
- *Tetratheca juncea* (Black-eyed Susan)

Vulnerable Fauna

- *Calyptorhynchus lathami lathami* (Glossy Black-Cockatoo)
- *Litoria aurea* (Golden Bell Frog)
- *Petaurus australis* (Yellow-bellied Glider)
- *Pteropus poliocephalus* (Grey-headed Flying Fox)

Endangered or Critically Endangered Flora

- *Corunastylis insignis* – syn. *Genoplesium insigne* (Variable Midge Orchid)
- *Corunastylis sp. Charmhaven* (syn. *Genoplesium branwhiteorum*)
- *Rhizanthella slateri* (Eastern Underground Orchid)
- *Thelymitra adorata* (Wyang Sun Orchid)

Endangered or Critically Endangered Fauna

- *Lathamus discolor* (Swift Parrot)
- *Phascolarctos cinereus* (Koala)

The assessments conducted in the following sections determine if the proposed action will have any significant impact on any MNES. If it is determined that there is a significant impact to any MNES then a referral of the matter to DCCEEW would be recommended.

Unless otherwise noted, the assessments have been conducted with reference to records of sightings in the BioNet Atlas (<https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet>) and information presented in NSW DPHI's threatened species profiles (<https://www.environment.nsw.gov.au/threatenedspeciesapp/>) and the published conservation advice and other documents referenced on the Commonwealth SPRAT page for each listed entity (<http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>).

Aquatic species have been assigned with a likelihood of occurrence of 'none' and have not been assessed further. This was determined as no anticipated impacts to habitat features for these species are likely to ensue as the proposed action will not result in impact to aquatic habitat.

Vulnerable Species Assessment

Vulnerable species are assessed on the basis of the presence of an 'important population', which is defined as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal;
- populations that are necessary for maintaining genetic diversity; and/or
- populations that are near the limit of the species range.

Where currently available information and survey results are insufficient to determine whether a local population of the species is present and eligible to be considered an 'important population', a precautionary approach has been adopted and the presence of an important population has been assumed. Therefore, all species with a moderate to high likelihood of occurrence have been afforded an AoS, in line with the EPBC Act 1999 *Significant Impact Guidelines 1.1* below.

Table 6 Assessments of Significance for Vulnerable Flora Species.

Vulnerable Flora	<i>Cryptostylis hunteriana</i> (Leafless Tongue-orchid)	<i>Grevillea parviflora</i> subsp. <i>parviflora</i> (Small-flowered Grevillea)	<i>Rutidosus heterogama</i> (Heath Wrinkelwort)	<i>Tetratheca juncea</i> (Black-eyed Susan)
Lead to a long-term decrease in the size of an important population;	Possible - No important populations of the species are known to occur in the area likely to be affected by the proposed action. The species is cryptic and may emerge only every 1–3 years. Poor winter and spring rainfall and a denser understorey may hamper flowering. Therefore, the survey effort cannot rule out the presence of an important population. Any population present in the area affected by the proposed action would be considered an important population under the Significant Impact Guidelines. A major threat for the species is removal of potential habitat. The proposed action would reduce by a small amount the area of available habitat and the viability of rehabilitated habitat for the species is uncertain. The proposed action may reduce the size of an important population (if present).	Yes - The proposed action may lead to a long-term decrease in the size of an important population. A population of the species was detected within the proposed area. This population exists as a part of a collective of other known local populations within a 10km radius. Any population present in the area affected by the proposed action would be considered an important population under the Significant Impact Guidelines. The proposed action will (depending on the final footprint) reduce the size of an important population.	Possible - No important populations of the species are known to occur in the area likely to be affected by the proposed action. The targeted survey effort undertaken did not identify presence of an important population of this species. The habitat present within the proposal area is marginally suitable for this species. Major threats for the species include removal of potential habitat and increasing pollution and nutrient from anthropogenic developments. Therefore, the proposed action has the potential to reduce the area of available habitat, and the viability of rehabilitated habitat for the species is uncertain. However, given the targeted survey efforts carried out did not identify this species, the proposed action is unlikely to reduce the size of an important population.	Yes - The proposed action may lead to a long-term decrease in the size of an important population. A population of the species was detected within the proposed area. This population exists as a part of a collective of other known local populations within a 10km radius. Any population present in the area affected by the proposed action would be considered an important population under the Significant Impact Guidelines. The proposed action will (depending on the final footprint) reduce the size of an important population.
Reduce the area of occupancy of an important population of the species;	Possible - The proposed action could reduce the area of occupancy of an important population of the species by up to 3 ha. Due to the cryptic nature of the species, the presence of an important population cannot be ruled out.	Yes - The proposed action will reduce the area of occupancy of an important population.	Possible - The proposed action could reduce the area of occupancy of an important population of the species by up to 3 ha (where present). However, targeted surveys did not identify this species or an important population of this species.	Yes - The proposed action will reduce the area of occupancy of an important population.
Fragment an existing important population into two or more populations;	Possible – The presence of an existing population cannot be ruled out. The effects on dispersal, genetic interchange, and other aspects of reproduction between plants separated by the proposed action are unknown. The proposed action may fragment an existing important population into two or more populations.	Possible - The proposed action may fragment an important population into two or more populations.	Possible - Targeted surveys did not identify this species or an important population of this species within the proposal area and therefore it is unlikely that the proposed action would fragment an existing important population into two or more populations.	Possible - The proposed action may fragment an important population into two or more populations.
Adversely affect habitat critical to the survival of a species;	Possible - The habitat is suitable for the species and is therefore considered critical habitat under the Significant Impact Guidelines and Conservation Advice (DCCEEW). Critical habitat relevant to the site of the proposed action includes (but is not limited to) coastal forest and dry woodland with open areas of understorey, accumulated Eucalyptus leaf litter and suitable soils. The presence of an existing population cannot not be ruled out. Therefore, the proposal may adversely affect habitat critical to the survival of a species.	Yes – An important population has been identified in the habitat within the proposed site. Furthermore, the habitat is suitable habitat for the species and therefore considered critical habitat under the Significant Impact Guidelines and Conservation Advice (DCCEEW). The specific criteria include shrubby woodland to open forest with a range of topography (e.g. sandy to gravelly clay, upper slopes or flat plains).	Possible - The habitat is suitable for the species and is therefore considered critical habitat under the Significant Impact Guidelines and Conservation Advice (DCCEEW). Critical habitat relevant to the site of the proposed action includes (but is not limited to) low lying coastal area and suitable soils. The presence of an existing population is unlikely. Therefore, the proposal is unlikely to adversely affect habitat critical to the survival of a species.	Yes – An important population has been identified in the habitat within the proposed site. Furthermore, the habitat is suitable habitat for the species and is therefore considered critical habitat under the Significant Impact Guidelines and Conservation Advice (DCCEEW). The specific criteria include coastal districts from Lake Macquarie to Bulahdelah and open forest with associated species throughout the proposed site (<i>Angophora costata</i> , <i>Corymbia gummifera</i> , and <i>Eucalyptus haemastoma</i>).
Disrupt the breeding cycle of an important population;	Possible – The presence of an existing population cannot be ruled out. The effects on dispersal, genetic interchange, and other aspects of reproduction between plants affected by the proposed action are unknown. It is possible that the proposed action will disrupt the breeding cycle of an important population.	Possible - The effects on dispersal, genetic interchange, and other aspects of reproduction between plants separated by the proposed alignment are unknown. It is that the proposed action will disrupt the breeding cycle of an important population.	Possible – This species was not identified during targeted surveys and therefore the presence of an existing population is unlikely. Subsequently, it is unlikely that the proposed action will disrupt the breeding cycle of an important population.	Possible - The effects on dispersal, genetic interchange, and other aspects of reproduction between plants affected by the proposed action are unknown. It is possible that the proposed action will disrupt the breeding cycle of an important population.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;	Yes - The habitat is suitable habitat for the species and therefore considered critical habitat under the Significant Impact Guidelines and Conservation Advice (DCCEEW). The proposed action would modify/destroy/remove up to 3 ha of habitat.	Yes - The habitat is suitable habitat for the species and therefore considered critical habitat under the Significant Impact Guidelines and Conservation Advice (DCCEEW). The proposed action would modify/destroy/remove up to 3 ha of quality habitat, making it likely that the species will decline to some extent.	Yes - The habitat is suitable habitat for the species and therefore considered critical habitat under the Significant Impact Guidelines and Conservation Advice (DCCEEW). The proposed action would modify/destroy/remove up to 3 ha of habitat.	Yes - The habitat is suitable habitat for the species and therefore considered critical habitat under the Significant Impact Guidelines and Conservation Advice (DCCEEW). The proposed action would modify/destroy/remove up to 3 ha of quality habitat, making it likely that the species will decline to some extent.
Result in invasive species that are harmful to a vulnerable species becoming established	No - The proposed action is unlikely to result in invasive species that are harmful to the vulnerable species becoming established in the species' habitat if the	No - The proposed action is unlikely to result in invasive species that are harmful to the vulnerable species becoming established in the species' habitat if the	No - The proposed action is unlikely to result in invasive species that are harmful to the vulnerable species becoming established in the species' habitat if the	No - The proposed action is unlikely to result in invasive species that are harmful to the vulnerable species becoming established in the species' habitat if the



Vulnerable Flora	<i>Cryptostylis hunteriana</i> (Leafless Tongue-orchid)	<i>Grevillea parviflora</i> subsp. <i>parviflora</i> (Small-flowered Grevillea)	<i>Rutidosus heterogama</i> (Heath Wrinkelwort)	<i>Tetratheca juncea</i> (Black-eyed Susan)
in the vulnerable species' habitat;	proposed mitigation measures (weed control programs, vehicle cleaning etc.) are adhered to. Note: Infestations of Bitou Bush is identified as a potential risk for the species.	proposed mitigation measures (weed control programs, vehicle cleaning etc.) are adhered to.	proposed mitigation measures (weed control programs, vehicle cleaning etc.) are adhered to.	proposed mitigation measures (weed control programs, vehicle cleaning etc.) are adhered to.
Introduce disease that may cause the species to decline; or	No - Mitigation measures will be implemented to prevent the introduction of plant diseases. Therefore, the proposed action is unlikely to introduce disease that may cause the species to decline.	No - Mitigation measures will be implemented to prevent the introduction of plant diseases. Therefore, the proposed action is unlikely to introduce disease that may cause the species to decline.	No - Mitigation measures will be implemented to prevent the introduction of plant diseases. Therefore, the proposed action is unlikely to introduce disease that may cause the species to decline.	No - Mitigation measures will be implemented to prevent the introduction of plant diseases. Therefore, the proposed action is unlikely to introduce disease that may cause the species to decline.
Interfere substantially with the recovery of the species.	Possible - Given the responses to the previous criteria in this assessment, the proposed action may interfere with the recovery of the species.	Possible - The proposed action may interfere substantially with the recovery of this species because of its potentially significant effects on the local population.	Possible - Given the responses to the previous criteria in this assessment, the proposed action may interfere with the recovery of the species.	Possible - The proposed action may interfere substantially with the recovery of this species because of its potentially significant effects on the local population.
Conclusion:	Unlikely - Although this species has been considered as having the potential to occur. The small area impact assessment results in this species being considered as not an SAI. Subsequently, this species does not require further assessment.	The proposed action is likely to have a significant impact upon the species.	Given the adequate survey effort, the proposed action is unlikely to result in a significant impact on the species.	The proposed action is likely to have a significant impact upon the species.

Table 7 Assessments of Significance for Vulnerable Fauna Species.

Vulnerable Fauna	<i>Calyptorhynchus lathami lathami</i> (Glossy Black-Cockatoo)	<i>Litoria aurea</i> (Golden Bell Frog)	<i>Petaurus australis</i> (Yellow-bellied Glider)	<i>Pteropus poliocephalus</i> (Grey-headed Flying Fox)
Lead to a long-term decrease in the size of an important population;	Potential - A long-term decrease in population size is possible with the permanent loss of this feeding and breeding habitat. The consequence of the proposed action is listed as a moderate risk. A population of the species is known to occur in the Lake Macquarie region. Targeted surveys confirmed the species presence within the proposed area utilising <i>Allocasuarina littoralis</i> as foraging habitat. Any population present in the area affected by the proposed action may be considered an important population under the Significant Impact Guidelines. The proposed action would remove up to 3 ha of habitat for the species, including areas of vegetation likely to contain primary feed trees (<i>A. littoralis</i>) which can have major consequences because of the species preference for individual feed trees. Some HBTs within the proposed site may be used for breeding (mature trees with hollows located near foraging habitat). This is likely to have at least some effect on the reproductive success of the population.	Potential - A long-term decrease in population size is possible with the permanent loss of this feeding and breeding habitat. The consequence of the proposed action is listed as a moderate risk. A population of the species is known to occur in the Lake Macquarie region. Any population present in the area affected by the proposed action may be considered an important population under the Significant Impact Guidelines. The proposed action would remove up to 3 ha of potential habitat for the species. Targeted surveys did not identify this species presence within the proposed area.	Potential - A long-term decrease in population size is possible with the permanent loss of this feeding and breeding habitat. The consequence of the proposed action is listed as a moderate risk. A population of the species is known to occur in the Lake Macquarie region. Any population present in the area affected by the proposed action may be considered an important population under the Significant Impact Guidelines. The proposed action would remove up to 3 ha of potential habitat for the species. Targeted surveys did not identify this species presence within the proposed area.	Potential - A long-term decrease in population size is possible with the permanent loss of this feeding and breeding habitat. The consequence of the proposed action is listed as a moderate risk. A population of the species is known to occur in the Lake Macquarie region. Any population present in the area affected by the proposed action may be considered an important population under the Significant Impact Guidelines. The proposed action would remove up to 3 ha of potential habitat for the species. Targeted surveys did not identify this species presence within the proposed area.
Reduce the area of occupancy of an important population of the species;	Yes – The species’ area of occupancy will be reduced by 3 ha.	No – This species was not identified during targeted surveys therefore it is determined that an important population does not exist within the proposal area.	No – This species was not identified during targeted surveys therefore it is determined that an important population does not exist within the proposal area.	No – This species was not identified during targeted surveys therefore it is determined that an important population does not exist within the proposal area.
Fragment an existing important population into two or more populations;	No - The species is aerial and would not be restricted by the impacts of the proposed action.	No – This species was not identified during targeted surveys therefore it is determined that an important population does not exist within the proposal area.	No – This species was not identified during targeted surveys therefore it is determined that an important population does not exist within the proposal area.	No – This species was not identified during targeted surveys therefore it is determined that an important population does not exist within the proposal area.
Adversely affect habitat critical to the survival of a species;	Potential - Given the relatively large contiguous area of habitat for this species within the Lake Macquarie region relative to that present in surrounding regions and its likely function as a stronghold for the species, it is likely to meet the criteria for being considered critical to the survival of the species. The removal of up to 3 ha of habitat is a minor impact relative to the area of suitable habitat available in the Lake Macquarie region. The proposed action will permanently remove primary feed trees and HBTs which are considered critical habitat for the species. This may increase competition for breeding resources and adversely impact the survival of the species in the long-term.	Potential - Given the relatively large contiguous area of potentially suitable habitat for this species within the Lake Macquarie region relative to that present in surrounding regions, it is unlikely that the habitat within the proposal area would meet the criteria for being considered critical to the survival of the species. The removal of up to 3 ha of marginally suitable habitat is a minor impact relative to the area of suitable habitat available in the Lake Macquarie region.	Potential - Given the relatively large contiguous area of potentially suitable habitat for this species within the Lake Macquarie region relative to that present in surrounding regions, it is unlikely that the habitat within the proposal area would meet the criteria for being considered critical to the survival of the species. The removal of up to 3 ha of habitat is a minor impact relative to the area of suitable habitat available in the Lake Macquarie region. The proposed action will permanently remove primary feed trees and HBTs which are considered critical habitat for the species. This may increase competition for breeding resources and adversely impact the survival of the species in the long-term.	Potential - Given the relatively large contiguous area of potentially suitable habitat for this species within the Lake Macquarie region relative to that present in surrounding regions, it is unlikely that the habitat within the proposal area would meet the criteria for being considered critical to the survival of the species. The removal of up to 3 ha of habitat is a minor impact relative to the area of suitable habitat available in the Lake Macquarie region.
Disrupt the breeding cycle of an important population;	Potential - The proposed action would require removal of up to 3 ha of habitat for the species, including vegetation likely to contain feed trees and HBTs potentially used for breeding. Given that the presence of suitably sized and shaped HBTs is a key constraint on the species breeding, the proposed action may disrupt its breeding.	Potential - The proposed action would require removal of up to 3 ha of potential habitat for this species, including vegetation likely to contain potential breeding habitat suitable for this species. Given this species was not identified during targeted surveys, it is unlikely that an important population occurs within the proposal area and therefore the breeding cycle of this species unlikely to be impacted.	Potential - The proposed action would require removal of up to 3 ha of potential habitat for the species, including vegetation likely to contain feed trees. Given that the lack of suitably sized HBTs within the proposal footprint, it is considered unlikely that the habitat within the proposal footprint would form important breeding resources and therefore is unlikely to disrupt the breeding cycle of this species.	Unlikely - The proposed action would require removal of up to 3 ha of potential habitat for the species, including vegetation likely to contain roosting and feeding resources, potentially used for breeding. Given that no roost sites were identified during targeted surveys, the proposed action is unlikely to disrupt the breeding cycle.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the	Potential - The proposed action will removal/destroy/modify of up to 3 ha of moderate–high quality habitat for the species. This is a small scale relative to the suitable habitat available in the Lake Macquarie region. However, the habitat to be impacted is considered critical habitat due to the presence of primary feed trees and HBTs. Therefore, the removal of this	Potential - The proposed action will removal/destroy/modify of up to 3 ha of potential habitat for this species. This is a small scale relative to the suitable habitat available in the Lake Macquarie region. It is unlikely the habitat to be impacted would be considered critical habitat due to the ephemeral nature of the damp areas of the site and its distance from	Potential - The proposed action will removal/destroy/modify of up to 3 ha of moderate–high quality habitat for the species. This is a small scale relative to the suitable habitat available in the Lake Macquarie region. However, the habitat to be impacted is considered critical habitat due to the presence of primary feed trees and potential for HBTs. Therefore, the removal of this habitat which may increase competition for	Potential - The proposed action will removal/destroy/modify of up to 3 ha of moderate–high quality habitat for the species. This is a small scale relative to the suitable habitat available in the Lake Macquarie region. However, the habitat to be impacted is considered critical habitat due to the presence of primary feed trees and roosting habitat. Therefore, the



Vulnerable Fauna	<i>Calyptrorhynchus lathamii lathamii</i> (Glossy Black-Cockatoo)	<i>Litoria aurea</i> (Golden Bell Frog)	<i>Petaurus australis</i> (Yellow-bellied Glider)	<i>Pteropus poliocephalus</i> (Grey-headed Flying Fox)
species is likely to decline;	habitat which may increase competition for breeding resources and potentially cause the species to decline.	bodies of water. Therefore, the removal of this habitat is unlikely to cause this species to decline.	breeding resources and potentially cause the species to decline.	removal of this habitat could potentially cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;	No - The proposed action is unlikely to introduce invasive species that are harmful to the species and enable them to become established if proper mitigation measures are followed.	No - The proposed action is unlikely to introduce invasive species that are harmful to the species and enable them to become established if proper mitigation measures are followed.	No - The proposed action is unlikely to introduce invasive species that are harmful to the species and enable them to become established if proper mitigation measures are followed.	No - The proposed action is unlikely to introduce invasive species that are harmful to the species and enable them to become established if proper mitigation measures are followed.
Introduce disease that may cause the species to decline; or	No - There are no new diseases likely to be introduced or promoted by the proposed action.	No - There are no new diseases likely to be introduced or promoted by the proposed action if proper mitigation measures are followed.	No - There are no new diseases likely to be introduced or promoted by the proposed action.	No - There are no new diseases likely to be introduced or promoted by the proposed action.
Interfere substantially with the recovery of the species.	Potential - The loss of habitat under the proposed action, which may affect the success of reproduction and thus, the size of the regional population to some degree, may interfere with the recovery of the species.	Potential - The loss of potential habitat under the proposed action, which may affect the success of reproduction and thus, the size of the regional population to some degree, may interfere with the recovery of the species.	Potential - The loss of habitat under the proposed action, which may affect the success of reproduction and thus, the size of the regional population to some degree, may interfere with the recovery of the species.	Potential - The loss of habitat under the proposed action, which may affect the success of reproduction and thus, the size of the regional population to some degree, may interfere with the recovery of the species.
Conclusion:	The proposed action will potentially have a significant impact upon the species.	Given the adequate survey effort, the proposed action is unlikely to result in a significant impact on the species.	The proposed action will potentially have a significant impact upon the species.	The proposed action will potentially have a significant impact upon the species.

Endangered or Critically Endangered Species

Table 8 Assessments of Significance for Endangered or Critically Endangered Flora Species.

Endangered or Critically Endangered Flora	<i>Corunastylis insignis</i> (syn. <i>Genoplesium insigne</i>) (Variable Midge Orchid)	<i>Corunastylis</i> sp. Charmhaven (syn. <i>Genoplesium branwhiteorum</i>)	<i>Rhizanthella slateri</i> (Eastern Underground Orchid)	<i>Thelymitra adorata</i> (Wyong Sun Orchid)
Lead to a long-term decrease in the size of a population;	Possible – There are known populations of the species within a 5km radius of the proposed action. Targeted surveys did not identify the species within the area to be affected. However, the species is cryptic – its flowering time is dependent on rainfall and limited to two weeks. If winter rain is absent the species will remain dormant. The species requires flowering material to identify. Therefore, the survey effort cannot rule out the presence of an important population. A major threat for the species is removal of potential habitat. The proposed action would reduce by a small amount the area of available habitat and the viability of rehabilitated habitat for the species is uncertain. The effects on dispersal and genetic interchange between plants separated by the proposed action is also unknown. The proposed action may lead to a long-term decrease in the size of a population if one is present.	Possible – No populations of the species are known to occur in the area likely to be affected by the proposed action. Due to the cryptic nature of the species, which are similar to those of <i>C. insignis</i>, the survey effort cannot rule out the presence of a population. A major threat for the species is removal of potential habitat. The proposed action would reduce by a small amount the area of available habitat and the viability of rehabilitated habitat for the species is uncertain. The effects on dispersal and genetic interchange between plants separated by the proposed action is also unknown. The proposed action may lead to a long-term decrease in the size of a population if one is present.	Possible – There is one known occurrence of this species around 10km north west of the proposed action. Targeted surveys did not identify the species within the area to be affected. However, the species is cryptic, and was not adequately surveyed for (Sep-Nov – TS Profile Bionet). Therefore, the survey effort cannot rule out the presence of an important population. A major threat for the species is removal of potential habitat. The proposed action would reduce by a small amount the area of potential habitat and the viability of rehabilitated habitat for the species is uncertain. The effects on dispersal and genetic interchange between plants separated by the proposed action is also unknown. The proposed action may lead to a long-term decrease in the size of a population if one is present.	Possible – There are known populations of the species within 10km of the proposed action. Targeted surveys did not identify the species. However, it is cryptic, has highly variable rates of emergence and does not flower every year. Its flowers may only open for a few hours a day during a two-week period. The species requires flowering material to identify. Therefore, the survey effort cannot rule out the presence of an important population. A major threat for the species is removal of potential habitat. The proposed action would reduce by a small amount the area of available habitat and the viability of rehabilitated habitat for the species is uncertain. The effects on dispersal and genetic interchange between plants separated by the proposed action is also unknown. The proposed action may lead to a long-term decrease in the size of a population if one is present.
Reduce the area of occupancy of the species;	Possible - Due to the cryptic natures of the species the presence of an important population cannot be ruled out. The proposed action could potentially reduce the area of occupancy of an important population of the species by up to 3 ha.	Possible - Due to the cryptic natures of the species the presence of an important population cannot be ruled out. The proposed action could potentially reduce the area of occupancy of an important population of the species by up to 3 ha.	Possible - Due to the cryptic natures of the species the presence of an important population cannot be ruled out. The proposed action could potentially reduce the area of occupancy of an important population of the species by up to 3 ha.	Possible - Due to the cryptic natures of the species the presence of an important population cannot be ruled out. The proposed action could potentially reduce the area of occupancy of an important population of the species by up to 3 ha.



Endangered or Critically Endangered Flora	<i>Corunastylis insignis</i> (syn. <i>Genoplesium insigne</i>) (Variable Midge Orchid)	<i>Corunastylis</i> sp. Charmhaven (syn. <i>Genoplesium branwhiteorum</i>)	<i>Rhizanthella slateri</i> (Eastern Underground Orchid)	<i>Thelymitra adorata</i> (Wyong Sun Orchid)
Fragment an existing population into two or more populations;	Possible – The presence of an existing population cannot be ruled out. The proposed action may fragment an existing population into two or more populations.	Possible – The presence of an existing population cannot be ruled out. The proposed action may fragment an existing population into two or more populations.	Possible – The presence of an existing population cannot be ruled out. The proposed action may fragment an existing population into two or more populations.	Possible – The presence of an existing population cannot be ruled out. The proposed action may fragment an existing population into two or more populations.
Adversely affect habitat critical to the survival of a species;	Yes - The habitat is suitable habitat for the species and is therefore considered critical habitat under the Significant Impact Guidelines and Conservation Advice (DCCEEW). The specific criteria include patches of <i>Themeda australis</i> and dry sclerophyll forest dominated by <i>Eucalyptus haemastoma</i> , <i>Corymbia gummifera</i> , <i>Angophora costata</i> , and <i>Allocasuarina littoralis</i> . The presence of an existing population cannot be ruled out. Therefore, the proposal may adversely affect habitat critical to the survival of a species.	Possible - The habitat is suitable habitat for the species and is therefore considered critical habitat under the Significant Impact Guidelines and Conservation Advice (DCCEEW). The specific criteria include low woodland with a shrubby understorey and ground layer with the presence of <i>Allocasuarina littoralis</i> and <i>Melaleuca nodosa</i> . The presence of an existing population cannot be ruled out. Therefore, the proposal may adversely affect habitat critical to the survival of a species.	Yes - Although the habitat requirements are poorly understood for this species, the habitat within the proposed action area is likely suitable habitat for the species and is therefore considered critical habitat under the Significant Impact Guidelines and Conservation Advice (DCCEEW). The presence of an existing population cannot be ruled out. Therefore, the proposal may adversely affect habitat critical to the survival of a species.	Possible - The habitat within the area to be affected is suitable habitat for the species, and includes woodland with a grassy understorey and well-drained soils. The typical associated habitat composition is partly present or absent from the proposed site, and it may not be considered critical habitat under the Significant Impact Guidelines and Conservation Advice (DCCEEW). The presence of an existing population cannot be ruled out. Therefore, the proposal may adversely affect habitat critical to the survival of a species.
Disrupt the breeding cycle of a population;	Possible – The presence of an existing population cannot be ruled out. The effects on dispersal, genetic interchange, and other aspects of reproduction between plants separated by the proposed action are unknown. It is possible that the proposed action will disrupt the breeding cycle of a population.	Possible – The presence of an existing population cannot be ruled out. The effects on dispersal, genetic interchange, and other aspects of reproduction between plants separated by the proposed action are unknown. It is possible that the proposed action will disrupt the breeding cycle of a population.	Possible – The presence of an existing population cannot be ruled out. The effects on dispersal, genetic interchange, and other aspects of reproduction between plants separated by the proposed action are unknown. It is possible that the proposed action will disrupt the breeding cycle of a population.	Possible – The presence of an existing population cannot be ruled out. The effects on dispersal, genetic interchange, and other aspects of reproduction between plants separated by the proposed action are unknown. It is possible that the proposed action will disrupt the breeding cycle of a population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;	Yes - The habitat is suitable habitat for the species and therefore considered critical habitat under the Significant Impact Guidelines and Conservation Advice (DCCEEW). The proposed action would modify/destroy/remove up to 3 ha of availability or quality habitat. The presence of an existing population cannot be ruled out. Therefore, the proposal may adversely affect habitat such the species declines.	Yes - The habitat is suitable habitat for the species and therefore considered critical habitat under the Significant Impact Guidelines and Conservation Advice (DCCEEW). The proposed action would modify/destroy/remove up to 3 ha of availability or quality habitat. The presence of an existing population cannot be ruled out. Therefore, the proposal may adversely affect habitat such the species declines.	Yes - Although the habitat requirements are poorly understood for this species, the habitat within the proposed action area is likely suitable habitat for the species and is therefore considered critical habitat under the Significant Impact Guidelines and Conservation Advice (DCCEEW). The proposed action would modify/destroy/remove up to 3 ha of availability or quality habitat. The presence of an existing population cannot be ruled out. Therefore, the proposal may adversely affect habitat such the species declines.	Possible - The habitat is suitable habitat for the species. The proposed action would modify/destroy/remove up to 3 ha of availability or quality habitat. The presence of an existing population cannot be ruled out. Therefore, the proposal may adversely affect habitat such the species declines.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;	No - The proposed action is unlikely to result in invasive species that are harmful to the vulnerable species becoming established in the species' habitat if the proposed mitigation measures (weed control programs, vehicle cleaning etc.) are adhered to. Note: Infestations of weeds are identified as a potential risk for the species.	No - The proposed action is unlikely to result in invasive species that are harmful to the vulnerable species becoming established in the species' habitat if the proposed mitigation measures (weed control programs, vehicle cleaning etc.) are adhered to. Note: Infestations of weeds area identified as a potential risk for the species.	No - The proposed action is unlikely to result in invasive species that are harmful to the vulnerable species becoming established in the species' habitat if the proposed mitigation measures (weed control programs, vehicle cleaning etc.) are adhered to.	No - The proposed action is unlikely to result in invasive species that are harmful to the vulnerable species becoming established in the species' habitat if the proposed mitigation measures (weed control programs, vehicle cleaning etc.) are adhered to. Note: Infestations of weeds are identified as a potential risk for the species.
Introduce disease that may cause the species to decline; or	No - Mitigation measures will be implemented to prevent the introduction of plant diseases. Therefore, the proposed action is unlikely to introduce disease that may cause the species to decline.	No - Mitigation measures will be implemented to prevent the introduction of plant diseases. Therefore, the proposed action is unlikely to introduce disease that may cause the species to decline.	No - Mitigation measures will be implemented to prevent the introduction of plant diseases. Therefore, the proposed action is unlikely to introduce disease that may cause the species to decline.	No - Mitigation measures will be implemented to prevent the introduction of plant diseases. Therefore, the proposed action is unlikely to introduce disease that may cause the species to decline.
Interfere with the recovery of the species.	Possible - Given the responses to the previous criteria in this assessment, the proposed action may potentially interfere with the recovery of the species.	Possible - Given the responses to the previous criteria in this assessment, the proposed action may potentially interfere with the recovery of the species.	Possible - Given the responses to the previous criteria in this assessment, the proposed action may potentially interfere with the recovery of the species.	Possible - Given the responses to the previous criteria in this assessment, the proposed action may potentially interfere with the recovery of the species.
Conclusion:	In the absence of adequate survey effort, the proposed action has the potential to result in a significant impact on the species.	In the absence of adequate survey effort, the proposed action has the potential to result in a significant impact on the species.	In the absence of adequate survey effort, the proposed action has the potential to result in a significant impact on the species.	In the absence of adequate survey effort, the proposed action has the potential to result in a significant impact on the species.

Table 9 Assessments of Significance for Critically Endangered and Endangered Fauna Species.

Critically Endangered Fauna	<i>Lathamus discolor</i> (Swift Parrot)	<i>Phascolarctos cinereus</i> (Koala)
Lead to a long-term decrease in the size of a population;	No - A long-term decrease in population size is possible with the permanent loss of important habitat in which the species is considered present (BOAMS 2023). The proposed action would remove up to 3 ha of habitat, which is a relatively small area within the surrounding large contiguous area of habitat. The habitat present does not include breeding habitat as the species breeds in Tasmania. Therefore, it is unlikely that the proposed action would decrease the size of a population.	Yes – The proposed action would remove up to 3 ha of habitat, which is a relatively small area within the surrounding large contiguous area of habitat. However, the habitat present is likely to constitute breeding habitat as a local population of this species occurs within the locality, with multiple records occurring within 1.5km of the proposed action area. Therefore, there is a potential that the proposed action would decrease the size of a population.
Reduce the area of occupancy of the species;	Yes - The known area of occupancy will be reduced by up to 3 ha. The permanent loss of important habitat under the proposed action will marginally reduce the area of occupancy of the local population.	Yes - The known area of occupancy will be reduced by up to 3 ha. The permanent loss of important habitat under the proposed action will marginally reduce the area of occupancy of the local population.
Fragment an existing population into two or more populations;	No - The species is aerial and would not be restricted by the impacts of the proposed action.	Yes - The known area of occupancy will be reduced by up to 3 ha. The clearing of vegetation will reduce the available habitat and cause a localised barrier, however is unlikely to fragment the local population of this species.
Adversely affect habitat critical to the survival of a species;	Yes - The habitat to be affected by the proposed action is identified as important habitat for the species. The removal of up to 3 ha of habitat is a relatively minor impact considering the area of suitable habitat available in the Lake Macquarie region. However, the habitat is noted as critical to the species and removal of such habitat may increase foraging and shelter competition within the area.	Yes - The habitat to be affected by the proposed action is identified as important habitat for the species. The removal of up to 3 ha of habitat is a relatively minor impact considering the area of suitable habitat available in the Lake Macquarie region. However, the habitat is noted as critical to the species and removal of such habitat may increase competition within the area.
Disrupt the breeding cycle of a population;	No - The species breeds in Tasmania, therefore, the proposed action is unlikely to disrupt the breeding cycle of a population.	Potential -The clearing of up to 3 ha of vegetation within an area already disturbed by clearing and industrial development, has the potential to further reduce critical habitat for this species, and cause the competitive dispersal of males beyond the known population. Therefore, there is a potential for the proposed action to disrupt the breeding cycle of the local population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;	Potential - The proposed action will removal/destroy/modify of up to 3 ha of important habitat for the species. This is a small area relative to the area of suitable habitat available in the Lake Macquarie region and will not affect its breeding, however, the precise value of the habitat to the species is unknown and its loss may cause the species to further decline.	Potential - The proposed action will removal/destroy/modify of up to 3 ha of important habitat for the species. This is a small area relative to the area of suitable habitat available in the Lake Macquarie region and will not affect its breeding, however, the precise value of the habitat to the species is unknown and its loss may cause the species to further decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;	No - The proposed action is unlikely to introduce invasive species that are harmful to the species and enable them to become established if proper mitigation measures are followed.	No - The proposed action is unlikely to introduce invasive species that are harmful to the species and enable them to become established if proper mitigation measures are followed.
Introduce disease that may cause the species to decline; or	No - There are no new diseases likely to be introduced or promoted by the proposed action.	No - There are no new diseases likely to be introduced or promoted by the proposed action.
Interfere with the recovery of the species.	Potential - The loss of habitat under the proposed action, which may affect the success of reproduction and thus, the size of the regional population to some degree, may interfere with the recovery of the species.	Potential - The loss of habitat under the proposed action, which may affect the success of reproduction and thus, the size of the regional population to some degree, may interfere with the recovery of the species.
Conclusion:	The proposed action will potentially have a significant impact upon the species.	The proposed action will potentially have a significant impact upon the species.

Attachment 3 – Survey Timetable

EcoResolve has completed the survey timetable in **Table 11** with reference to relevant survey guidelines for species survey times (BAM, 2020).

Table 10 Required Survey Types

	Survey Type
	Flora surveys
	Spotlighting/call-playback
	Opportunistic
	Koala SAT
	Acoustic recorder (Anabat/songmeter)
	Camera traps
	Pitfall Trapping, Funnel Traps
	Other Survey Techniques (e.g. suitable habitat/rocks, diurnal camp surveys)
	Additional Suitable Survey months
	Dawn and/or Dusk Bird Survey
	Not Suitable Survey Month

Table 11 Threatened Flora and Fauna Survey Requirements

Scientific Name (Common Name)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Acacia bynoeana</i> (Bynoe's Wattle)												
<i>Angophora inopina</i>												
<i>Anthochaera phrygia</i> (Regent Honeyeater)												
<i>Apus pacificus</i>												
<i>Asperula asthenes</i> (Trailing Woodruff)												
<i>Caladenia tessellate</i> (Thick-Lip Spider Orchid)												
<i>Callocephalon fimbriatum</i> (Gang-gang Cockatoo)												
<i>Calyptrorhynchus lathami lathami</i> (Glossy Black-Cockatoo)												
<i>Chalinolobus dwyeri</i> (Large-eared Pied Bat)												
<i>Corunastylis insignis</i> (Variable Midge Orchid)												
<i>Corunastylis sp. charmhaven</i>												
<i>Cryptostylis hunteriana</i> (Leafless Tongue-orchid)												
<i>Cynanchum elegans</i> (White-flowered Wax Plant)												
<i>Dasyurus maculatus maculatus</i> (Spotted-tailed Quoll)												
<i>Diuris praecox</i> (Rough Doubletail)												
<i>Erythrotriorchis radiatus</i> (Red Goshawk)												

Scientific Name (Common Name)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Eucalyptus camfieldii</i>												
<i>Eucalyptus parramattensis subsp. decadens</i>												
<i>Euphrasia arguta</i>												
<i>Falco hypoleucos</i> (Grey Falcon)												
<i>Grevillea parviflora subsp. parviflora</i> (Small-flowered Grevillea)												
<i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle)												
<i>Hirunapus caudacutus</i> (White Throated Needletail)												
<i>Heleioporus australiacus</i> (Giant Burrowing Frog)												
<i>Lathamus discolor</i> (Swift Parrot)												
<i>Litoria aurea</i> (Green and Golden Bell Frog)												
<i>Litoria littlejohni</i> (Littlejohn’s Tree Frog)												
<i>Melaleuca biconvexa</i> (Biconvex Paperbark)												
<i>Melanodryas cucullata cucullata</i> (Hooded Robin (south-eastern))												
<i>Monarcha melanosis</i> (Black-faced Monarch)												
<i>Mixophyes balbus</i> (Stuttering Frog)												
<i>Mixophyes iteratus</i> (Giant Barred Frog)												
<i>Neophema chrysostoma</i> (Blue-winged Parrot)												
<i>Persicaria elatior</i> (Tall Knotweed)												
<i>Petauroides volans</i> (Greater Glider)												
<i>Petaurus australis australis</i> (Yellow-bellied Glider)												
<i>Phascolarctos cinereus</i> (Koala)												
<i>Potorous tridactylus tridactylus</i> (Long-nosed Potoroo)												
<i>Prostanthera askania</i> (Tranquillity Mintbush)												
<i>Pseudomys novaehollandiae</i> (New Holland Mouse)												
<i>Pteropus poliocephalus</i> (Grey-headed Flying-fox)												
<i>Pterostylis gibbosa</i> (Illawarra Greenhood)												
<i>Pycnoptilus floccosus</i> (Pilot Bird)												

Scientific Name (Common Name)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Rhizanthella slateri</i>												
<i>Rhodamnia rubescens</i> (Scrub Turpentine)												
<i>Rhodomyrtus psidioides</i> (Native Guava)												
<i>Rostratula australis</i> (Painted Snipe)												
<i>Rutidosia heterogama</i> (Heath Wrinklewort)												
<i>Stagonopleura guttata</i> (Diamond firetail)												
<i>Syzygium paniculatum</i> (Magenta Lilly Pilly)												
<i>Tetradlea juncea</i> (Black-eyed Susan)												
<i>Thelymitra adorata</i> (Wyong Sun Orchid)												
<i>Thesium australe</i> (Austral Toadflax)												
<i>Uperoleia mahonyi</i> (Mahony's Toadlet)												



Appendix G – Anabat Analysis Report

TABLE G1. ANABAT PRESENCE DATA SHOWING BAT SPECIES RECORDED

Scientific Name	Common Name	BC Act	EPBC Act	Presence	Confidence	No. of passes	Notes
<i>Austronomus australis</i>	White-striped Freetail-bat			+	C		-
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat			+	C		-
<i>Chalinolobus morio</i>	Chocolate Wattled Bat			+	Pr		-
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V		+	C	9	See Figure G2 for call frequency.
<i>Miniopterus australis</i>	Little Bentwing-bat	V		+	C	27	See Figure G1 for call frequency.
<i>Miniopterus orianae oceanensis</i>	Large Bentwing-bat	V		+	C	8	Numerous examples of downward sweeping tails at this frequency with uneven pulse shape/Time Between Calls which differentiate from <i>V. regulus</i> and <i>V. darlingtonia</i> . See Figure G3 for call frequency
<i>Ncytophilus sp.</i>	Long-eared Bat sp.			+	Pr		There is a possibility that some of the vertical calls within the dataset are from Southern Myotis but it is difficult to differentiate between these genuses.
<i>Ozimops ridei</i>	Eastern Free-tailed Bat			+	C		-
<i>Saccolaimis flaviventris</i>	Yellow-bellied Sheath-tail-bat	V		+	C	2	The calls aren't high quality but they are within the species' frequency range and the example shows the harmonics characteristic of this species. See Figure G4 for call frequency
<i>Scotorepens orion</i>	Eastern Broad-nosed Bat			+	Pr		-
<i>Vespadelus pumilus</i>	Eastern Forest Bat			+	Pr		-
<i>Vespadelus vulturnus</i>	Little Forest Bat			+	C		-

C = confident, Cr = Probable, Po = Possible, V = Vulnerable



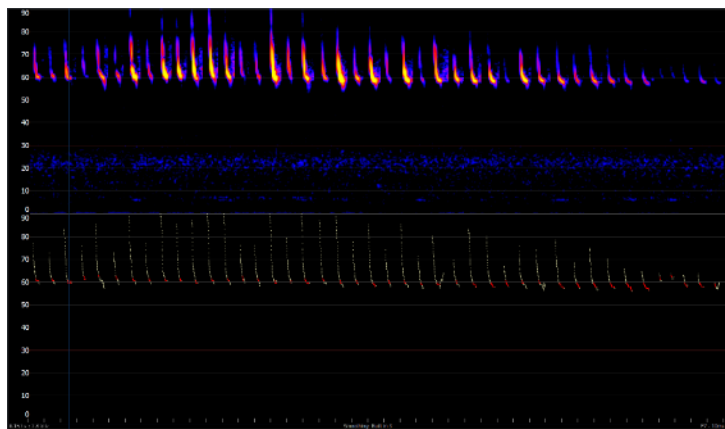


FIGURE G1. *MINIOPTERUS AUSTRALIS* CALL FREQUENCY

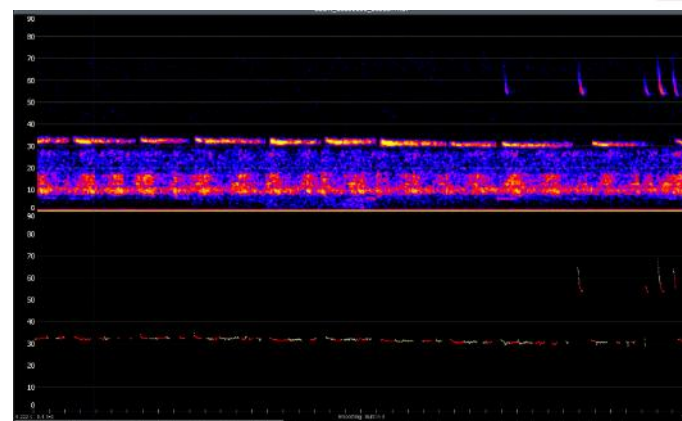


FIGURE G2. *MICRONOMUS NORFOLKENSIS* CALL FREQUENCY

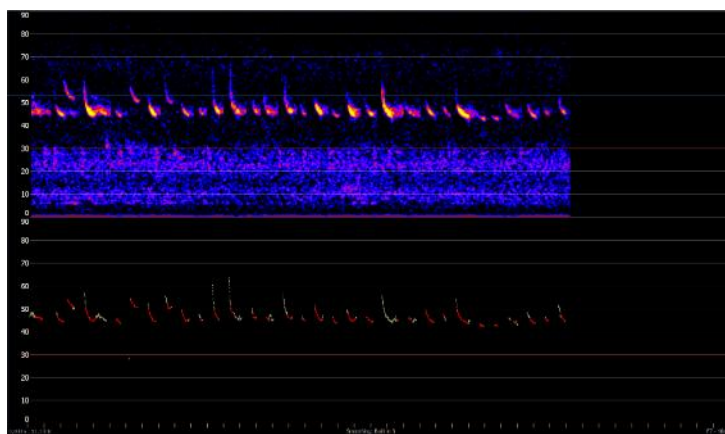


FIGURE G3. *MINIOPTERUS ORIANAE OCEANENSIS* CALL FREQUENCY

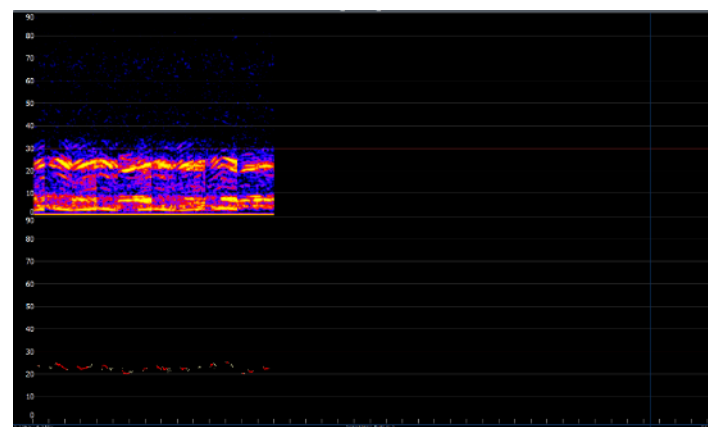


FIGURE G4. *SACCOLAIMIS FLAVIVENTRIS* CALL FREQUENCY

