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Biodiversity Technical Report

Murray Terminal BESS

45 Waterfall Farm Road, Khancoban

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Acronyms and Abbreviations

BAM	Biodiversity Assessment Methodology
BAM-C	BAM Calculator
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
BDAR	Biodiversity Development Assessment Report
BESS	Battery Energy Storage System
Biosecurity Act	<i>Biosecurity Act 2015 (NSW)</i>
CE	Critically endangered
DBH	Diameter at breast height
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Cth) (formerly DAWE)
DCCEEW	Department of Climate Change, Energy, the Environment and Water (NSW) (formerly DPE)
DPE	(Former) Department of Planning and Environment (NSW) (now DCCEEW and DPHI)
DPHI	Department of Planning, Housing and Infrastructure (NSW) (formerly DPE)
E	Endangered
EEC	Endangered ecological community – as defined under relevant law applying to the proposal
EIA	Environmental impact assessment
EIS	Environmental impact statement
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
GIS	Geographic information system
GPS	Geographical positioning system
ha	hectares
HBT	Habitat Tree

IBRA	Interim Biogeographic Regionalisation for Australia
KFH	Key Fish Habitat
km	kilometres
LEP	Local Environment Plan
LCA	Land Category Assessment
LGA	Local government area
m	metres
MW	Megawatt
MNES	Matters of National Environmental Significance under the EPBC Act (<i>c.f.</i>)
NV Act	<i>Native Vegetation Act 2003 (NSW)</i>
NVP	Native Vegetation Mapping
OEH	(Former) Office of Environment and Heritage (NSW) (now EES)
P&E Act	<i>Planning and Environment Act 1987</i>
PMST	Protected matters search tool
PCT	Plant Community Type
REF	Review of Environmental Factors
RAP	Rapid Assessment Point
SEARS	Secretary's Environmental Assessment Requirements
SSD	State Significant Development
Sp/spp	Species/multiple species
TEC	Threatened ecological community
V	Vulnerable

1. Introduction

NGH Consulting have completed this biodiversity technical report to assist the proponent in identifying biodiversity impacts that are likely to arise from the development of a Battery Energy Storage System (BESS) next to the Murray Terminal Substation. Biodiversity constraints identified align with impacts considered under the Biodiversity Conservation Act (2016) and corresponding Biodiversity Assessment Method (BAM 2020) as well as Matters of National Environmental Significance (MNES). This report will assist in the development of measures required to be addressed as outlined in the State Environmental Assessment Requirements (SEARS).

1.1. Proposal description

The Project would involve the construction, operation and decommissioning of a BESS and associated road intersection upgrades.

The proposed development is located 2.2km Southeast of Khancoban township within the foot slopes of the valley containing Khancoban Pondage which flows into the Murray River. The project involves development of two areas:

- Upgrade at the intersection of Alpine Way and M2 Power Station Rd, and
- Construction of a BESS.

The project site is located 1.7km south from the intersection of the Alpine Way and M2 Power Station Rd. The Murray Substation is located approximately 700 m north from the proposed BESS location. It is located within the Snowy Valleys Local Government Area (LGA) and is zoned as Primary Production (RU1) under the Tumbarumba Local Environmental Plan (LEP) 2022 (Figure 1-1).

The main land use within the locality is agriculture, mostly grazing of sheep and cattle. Agriculture has modified a lot of Box Gum Woodland within the Khancoban valley which appears to be dominated by Blakely's Red Gum (*Eucalyptus blakelyi*) and Yellow Box (*E. melliodora*) away from watercourses and River Red Gum (*E. camaldulensis*) along waterways. There has been much modification of groundcover locally with a lot of pasture improvement observed.

1.1.1. Definitions

The following terminology is used in this report (Table 1-1):

Table 1-1 Terminology used in this report

Terminology	Definition
The Project	The Murray Terminal BESS including road intersection upgrades.
Project Site	Area investigated for Biodiversity impacts, as shown on figure 1-1 below. It includes the BESS area and the road intersection between Alpine Way and M2 Power Station Road. The project site covers an area of 19.95 ha.
Development Footprint	The area of land that would be directly impacted by project construction. The Development Footprint has not been created at this stage of the assessment. It

would be established within the Project Site and be subject to the consideration of constraints identified through further detailed assessment and consultation.



Figure 1-1 Project Site

2. Methods

2.1. Desktop assessment

Background searches were undertaken on 24th January (Commonwealth) and 24th April (Bionet), using a 10 km buffer around the Project Site and included:

- Information about landscape character, Interim Biogeographic Regionalisation of Australia (IBRA) bioregions and sub-regions
- Hydrology including wetlands and watercourses
- State Vegetation Type Mapping
- Biodiversity Values Mapping to identify important fauna and/or flora habitat values
- Records of threatened entities which exist within a 10km radius of the project site (NSW BioNet Atlas search and a Protected Matters Search (PMST) for Commonwealth Matters of National Environmental Significance)
- Identifying Key Fish Habitat (KFH) and threatened fish distributions
- Native Vegetation Regulatory Mapping to identify regulated and non-regulated land within the project site.

2.2. Field assessment

Two NGH ecologists conducted a field inspection from 29 January to 30 January 2025. The entirety of the Project Site was traversed on foot to assess the biodiversity constraints. The aim of the field inspection was to:

- Undertake broad vegetation mapping and identify the Plant Community Types (PCT) within the Project Site, mostly through identifying endemic trees existing onsite,
- To conduct a series of 100m transects to quantitatively assess the proportion of native and exotic groundcover present, as well as flora species within a 0.1ha area.
- Identify habitat suitable for threatened species, based on desktop searches for threatened plants and animals and threatened ecological communities known to occur locally. Any incidental sightings of threatened species during the site inspection will also be assessed accordingly.

Vegetation mapping

Rapid Assessment Points (RAP) were undertaken across multiple areas within the Project Site, capturing a range of condition classes present. Additional RAPs were recorded incidentally at observed areas of interest during the field investigation. Binoculars were used for locations unable to be accessed and where it was possible to observe the site from a distance (up to 300m away).

Each RAP site was recorded on a GPS enabled Android tablet using data collection software. The following information was collected (based on observing a 100m radius around the point):

- The three most dominant flora species in the upper, middle and lower stratum of vegetation (where present).
- Only endemic species were noted, primarily to use for PCT classification.

- If exotic species were prevalent, then species were noted as an additional comment in the field form.
- The percent native cover of all endemic species (%) for each vegetation stratum was also estimated.
- Landscape features such as landform and soil type were also observed and recorded.
- A photo was taken of each RAP site to provide a visual representation of the data recorded at each point. Photos were also taken throughout the project site to visually capture important site features of interest.

In addition to RAPs, 100m transects were also conducted within the project site noting;

- The percentage of native groundcovers compared to exotic groundcover and bare ground or rock over 100 metres (step point at every 1m tape interval), expressed as a percentile.
- A list of plant species was also collected within a 100m x 10m quadrat (0.1ha area) to determine whether the groundcover might classify as EPBC Act listed Box Gum Woodland or a secondary grassland.
- The 100m transects are consistent with the transect-intercept method outlined in the NSW Government Interim Grassland and other Groundcover Assessment Method document (OEH, 2018). The transects enable an ecologist to quantify, hence not estimate, the percentage of native groundcover along a chosen 100m transect. The method involves laying a tape and walking 100 metres (m) and recording the presence of either exotic, native or abiotic entity (such as bare ground or rock) at each 1m mark to provide 100 points of data to create a percentile. The method takes approximately 15 minutes to complete. NGH applied this method to determine the percentage of native cover compared to exotic species present within derived grassland or cropped areas of the Project Site.

Preliminary PCT identification was undertaken by:

- 1) Viewing PCTs mapped on the Statewide Vegetation Map already within 1km of the site (DCCEEWS NSW, 2024b) and
- 2) Comparing species found during RAPs to existing mapped PCTs.

Fauna habitat

Potential habitat for threatened species was noted during the field assessment, mainly by taking incidental observations throughout the two-day site inspection. Site features noted included:

- Presence of abiotic habitat components such as rocks or rock outcrops, including attributes such as size of rocks (small (0-20 cm) or large (20 cm+)), embedded or surface rocks, and rock type to determine whether rocks could provide suitable habitat for threatened reptiles including Pink-tailed Legless Lizard (*Aprasia parapulchella*) and Striped Legless Lizard (*Delmar impar*).
- Inspecting for presence of ant nest holes around RAPs or rock outcrops which is evidence of a potential food/roosting source for threatened reptiles.
- Using floristic data from RAPs to identify native tussock niche habitat for threatened species including Striped Legless Lizard (*Delmar impar*).
- Observing waterways and farm dams and their suitability for threatened frogs and microbats.
- Noting presence of any hollow bearing trees (HBTs) live or dead. Dimensions of hollows and individual trees were mapped where possible. This is in consideration of threatened owl and parrot species, such as Barking Owl (*Ninox connivens*), Masked Owl (*Tyto novaehollandiae*), Squirrel Glider

(*Petaurus norfolcensis*), Gang-gang cockatoo (*Callocephalon fimbriatum*), Glossy black cockatoo (*Calyptorhynchus lathami*) and Superb Parrot (*Polytelis swainsonii*).

- Recording other observations where relevant to biodiversity impacts from the proposed development.

3. Limitations

- RAPs are subjective depending on the person conducting survey and they capture general floristic information. Vegetation integrity plots would be required to capture quantitative data used to support a Land Category Assessment and/or classification of vegetation as exotic.
- Groundcover assessment floristics can vary greatly depending on climatic influences and season at time of survey. Transects were undertaken in late summer and site conditions were observed to be dry at the time of assessment. All paddocks inspected had grazing pressure by cattle and sheep. Although grazed, plants observed could still be identified with confidence onsite during the 100m tape transects with pasture appearing like a lawn (refer to Figure 4-6).
- PCT mapping and native cover abundance could change over time following full floristic assessment and variation in climate and grazing regimes.
- The spatial location recorded of habitat trees has been adjusted (by 5-10m) to visually align with trees observed on aerial base maps.

4. Results

4.1. Desktop results

4.1.1. Matters of national environmental significance (MNES)

Tables 4-1 to 4-5 details the results of the Prescribed Matters Search Tool Results that are most applicable to the project site. Please refer to Appendix A for the full list of entities derived from the search.

There are no wetlands of significance within or adjacent to the project area.

The following federally listed species were considered to have a high potential to occur within the BESS area;

- Gang-gang Cockatoo (*Callocephalon fimbriatum*)

The following Threatened Ecological Communities (TEC) were considered to have a high potential to occur within the road intersection;

- White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland CEEC

The following federally listed species were considered to have moderate potential to utilise habitat within the BESS area;

- Brown Treecreeper (*Climacteris picumnus victoriae*),
- Painted Honeyeater (*Anthochaera phrygia*),
- Swift Parrot (*Lathamus discolor*) and
- Superb Parrot (*Polytelis swainsonii*).
- South-eastern Hooded Robin (*Melanodryas cucullata cucullata*)

The following federally listed species were considered to have moderate potential to utilise habitat within the road intersection;

- Australian Painted Snipe (*Rostratula australis*),
- Diamond Firetail (*Stagonopleura guttata*),
- Boorolong Frog (*Litoria booroolongensis*),
- Greater Glider (*Petauroides volans*) and
- Koala (*Phascolarctos cinereus*).

Table 4-1 EPBC Act Wetlands of International Importance (Ramsar Wetlands)

Ramsar Wetlands	Likelihood of presence inside Project Site	Presence (Y/N)	Justification
Banrock Station Wetland Complex	Low	N	Project Site is 700km away. Proposal unlikely to directly or indirectly impact wetland.
Barmah Forest	Low	N	Project Site is 200km away. Proposal unlikely to directly or indirectly impact wetland.

Ramsar Wetlands	Likelihood of presence inside Project Site	Presence (Y/N)	Justification
Gunbower Forest	Low	N	Project Site is 300km away. Proposal unlikely to directly or indirectly impact wetland.
Hattah-kulkyne Lakes	Low	N	Project Site 500km away. Proposal unlikely to directly or indirectly impact wetland.
NSW Central Murray State Forests	Low	N	Project Site is 200km away. Proposal unlikely to directly or indirectly impact wetland.
Riverland	Low	N	Project Site is 600km away. Proposal unlikely to directly or indirectly impact wetland.
The Coorong, and Lakes Alexandrina and Albert Wetland	Low	N	Project Site is 700km away. Proposal unlikely to directly or indirectly impact wetland.

Table 4-2 EPBC Act Threatened Ecological Communities with potential to exist inside the project site

Threatened Ecological Communities (TEC)	Habitat suitability within project site 1. BESS Area 2. Road Intersection	Presence (Y/N)	Justification
Alpine Sphagnum Bogs and Associated Fens	1. Low 2. Low	1. No 2. No	No associated PCTs found onsite. No Sphagnum or peat soils or species observed aligning with this TEC.
Natural Temperate Grassland of the South Eastern Highlands	1. Moderate 2. Moderate	1. No 2. No	Lack of representative native grassland species present within project site. All

Threatened Ecological Communities (TEC)	Habitat suitability within project site 1. BESS Area 2. Road Intersection	Presence (Y/N)	Justification
			groundcover surveyed was comprised of exotic dominated pastures.
White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland	1. High 2. High	1. No 2. No	1. Unable to find any Box gum trees. representing this TEC inside the BESS Area Remnant trees were all River Red Gums (<i>E. camaldulensis</i>). All ground cover is exotic dominated pastures. 2. Apple Box (<i>E. bridgesiana</i>) was found dominating the upper stratum and is not a key indicator species for Commonwealth box gum woodland TEC, therefore ruled out.

Table 4-3 EPBC Act Threatened plants with potential to exist inside the project site

Species	Habitat suitability within project site 1. BESS Area 2. Road Intersection	Likelihood of being present	Justification
River Swamp Wallaby-grass <i>Amphibromus fluitans</i>	1. Low 2. Moderate	1. Low 2. Mod	1. Inadequate habitat, no wetlands at BESS area. 2. Marginal habitat includes some seepage from a gully upslope draining steeply a to culvert under Alpine Way.
Crimson Spider-orchid <i>Caladenia concolor</i>	1. Low 2. Moderate	1. Low 2. Mod	1. Agricultural landscape with highly modified groundcover. No remnant woodland or native groundcover present inside project site. 2. Habitat has potential to harbor ground orchids.
Mauve Burr Daisy <i>Calotis glandulosa</i>	1. Moderate 2. Moderate	1. Mod 2. Mod	1. Modified agricultural landscape containing exotic pastures. Refer to Transect results (

Species	Habitat suitability within project site 1. BESS Area 2. Road Intersection	Likelihood of being present	Justification
			Table 4-9). Steeper parts of site may form marginal habitat. 2. Moderate habitat potential at Rd intersection with dry sclerophyll forest present and poor metasedimentary soils.
Curtis Colobanth <i>Colobanthus curtisiae</i>	1. Low 2. Moderate	1. Low 2. Mod	1. Lack of Poa or Themeda grasslands inside project site. Refer to Transect results (Table 4-9). 2. Marginal habitat present, some native grasses present along road verge.
Pale Golden Moths <i>Diuris ochroma</i>	1. Low 2. Moderate	1. Low 2. Mod	1. Modified agricultural landscape containing exotic pastures. Refer to Transect results (Table 4-9). Steeper parts of site may form marginal habitat. 2. Moderate habitat potential at Rd intersection with dry sclerophyll forest present.
Clover Glycine <i>Glycine latrobeana</i>	1. Low 2. Moderate	1. Low 2. Mod	1. Modified agricultural landscape containing exotic pastures. Refer to results of Transects (Table 4-9). Steeper parts of site may form marginal habitat. 2. Moderate habitat potential at Rd intersection with dry sclerophyll forest present.
Wingless Raspwort <i>Haloragis exalata</i> subsp. <i>exalata</i>	1. Low 2. Low	1. Low 2. Mod	1. Inadequate habitat, no wetlands or damp shaded habitat onsite.

Species	Habitat suitability within project site 1. BESS Area 2. Road Intersection	Likelihood of being present	Justification
			2. Marginal habitat includes a steep gully/minor riparian zone.
Spiny Peppercress <i>Lepidium aschersonii</i>	1. Low 2. Low	1. Low 2. Low	Incorrect distribution.
<i>Pimelea bracteata</i>	1. Low 2. Low	1. Low 2. Low	Inadequate habitat, no wetlands at Rd intersection or BESS area.
Bago Leek-orchid <i>Prasophyllum bagoense</i>	1. Low 2. Low	1. Low 2. Low	No sub-alpine grassy or heath plain wetland habitat onsite.
Tarengo Leek Orchid <i>Prasophyllum petilum</i>	1. Low 2. Low	1. Low 2. Low	No Natural Temperate Grasslands inside project site or road intersection. Refer to tape transects for species surveyed (Table 4-9).
Blue-tongued Orchid <i>Pterostylis oreophila</i>	1. Low 2. Low	1. Low 2. Low	No sub-alpine habitat, no tea tree thickets.
Anemone Buttercup <i>Ranunculus anemoneus</i>	1. Low 2. Low	1. Low 2. Low	Inappropriate habitat, no short alpine herb fields inside project site.
Small Purple-pea <i>Swainsona recta</i>	1. Low 2. Moderate	1. Low 2. Mod	1. Groundcover too highly modified to support this species. Refer to results of transects (Table 4-9). 2. Some marginal grassy habitat present on road verge forming some potential habitat.

Species	Habitat suitability within project site 1. BESS Area 2. Road Intersection	Likelihood of being present	Justification
Austral Toadflax <i>Thesium australe</i>	1. Low 2. Moderate	1. Low 2. Mod	1. Groundcover too highly modified to support this species. Refer to results of transects (Table 4-9). 2. Some marginal grassy habitat present on road verge forming some potential habitat.
Dwarf Violet <i>Viola improcera</i>	1. Low 2. Low	1. Low 2. Low	Project site elevation is well below 1300m, no snow gum woodland habitat.
Swamp Everlasting <i>Xerochrysum palistre</i>	1. Low 2. Moderate	1. Low 2. Mod	1. Inadequate habitat, no wetlands onsite. 2. Marginal habitat includes some seepage from a gully upslope draining steeply a to culvert under Alpine Way.

Table 4-4 EPBC Act Threatened fauna species with potential to exist inside the project site

Species relevant to PCT 79 & 295	Habitat suitability within project site 1. BESS Area 2. Road Intersection	Likelihood of being present	Justification 1. BESS Area 2. Rd Intersection
Regent Honeyeater <i>Anthochaera phrygia</i>	1. Low 2. Low-Mod	1. Low 2. Low	1. Lack of nectar bearing box gum trees inside project site. 2. Some isolated <i>E. bridgesiana</i> trees on road verge near road intersection that may provide marginal foraging resources.
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i>	1. High 2. High	1. High 2. High	1. Observed incidentally flying over project site and roosting in planted and exotic trees. 2. Likely to utilise trees for foraging-roosting at road intersection.
Brown Treecreeper <i>Climacteris picumnus victoriae</i>	1. Mod 2. Mod	1. Mod 2. Mod	1. Lack of trees inside the project site. Could utilise planted native trees and isolated scattered trees and dry sclerophyll forest on road intersection but movement likely restricted due to lack of connectivity to surrounding forest/woodland. 2. PCT 295 would provide suitable habitat for Brown Treecreeper.
Painted Honeyeater <i>Grantiella picta</i>	1. Mod 2. Mod	1. Mod 2. Mod	1. Lack of trees inside the project site. Low potential to utilise isolated scattered trees present due to lack of connectivity to surrounding forest/woodland. 2. Some isolated <i>E. bridgesiana</i> trees on road verge and forest near road intersection might provide marginal foraging resources.
Swift Parrot <i>Lathamus discolor</i>	1. Mod 2. Mod	1. Mod 2. Mod	Known to migrate and breed in Tasmania. 1. Isolated scattered River Red Gums could provide potential nectar resource. No Bionet Atlas records within 10km radius. 2. Some isolated <i>E. bridgesiana</i> trees on road verge and forest near road

Species relevant to PCT 79 & 295	Habitat suitability within project site 1. BESS Area 2. Road Intersection	Likelihood of being present	Justification 1. BESS Area 2. Rd Intersection
			intersection might provide marginal foraging resources.
South-eastern Hooded Robin <i>Melanodryas cucullata cucullata</i>	1. Mod 2. Mod	1. Mod 2. Mod	No Bionet Atlas records within 10km radius. 1. Known to occupy disturbed agricultural landscapes with scattered remnant trees. 2. Known to occupy dry sclerophyll forest patches also.
Superb Parrot <i>Polytelis swainsonii</i>	1. Mod 2. Mod	1. Mod 2. Mod	No Bionet Atlas records within 10km radius. 1. Known to occupy disturbed agricultural landscapes with scattered remnant trees. 2. Known to occupy dry sclerophyll forest patches, especially riparian areas also.
Australian Painted Snipe <i>Rostratula australis</i>	1. Low 2. Mod	1. Low 2. Mod	1. No wetland habitat inside project site. 2. Some seepage from gully above steeply draining to culvert under road.
Diamond Firetail <i>Stagonopleura guttata</i>	1. Low 2. Mod	1. Low 2. Mod	1. Lack of trees and absence of midstory vegetation inside the project site. Low potential to utilise isolated scattered trees present due to lack of connectivity to surrounding forest/woodland. 2. Some dry sclerophyll forest with shrubs provides suitable habitat
Boorolong Frog <i>Litoria booroolongensis</i>	1. Low 2. Mod	1. Low 2. Mod	1. Lack of suitable riparian habitat inside the project site. No permanent streams. 2. Marginal habitat includes some seepage from gully above steeply draining to culvert under road.
Spot-tailed Quoll <i>Dasyurus maculatus maculatus</i>	1. Low 2. Low	1. Low 2. Low	1. May opportunistically forage onsite but there is no breeding/roosting habitat present.

Species relevant to PCT 79 & 295	Habitat suitability within project site 1. BESS Area 2. Road Intersection	Likelihood of being present	Justification 1. BESS Area 2. Rd Intersection
			2. May opportunistically forage onsite but there are too many disturbances to form adequate breeding habitat present.
Greater Glider <i>Petauroides volans</i>	1. Low 2. Mod	1. Low 2. Mod	1. Lack of forested vegetation, lack of trees inside project site. 2. Marginal habitat includes some forest and one hollow bearing tree connecting onto more extensive forest.
Yellow-bellied Glider <i>Petaurus australis australis</i>	1. Low 2. Mod	1. Low 2. Mod	1. Lack of forested vegetation, lack of trees inside project site. 2. Marginal habitat includes some forest and one hollow bearing tree connecting onto more extensive forest.
Koala <i>Phascolarctos cinereus</i>	1. Low 2. Mod	1. Low 2. Mod	1. Lack of forested vegetation, lack of trees inside project site. 2. Marginal habitat includes some forest.

Table 4-5 EPBC Act Migratory species with potential to exist inside the project site

Species relevant to PCT 79 & 295	Habitat suitability within project site 1. BESS Area 2. Road Intersection	Likelihood of being present	Justification
Fork-tailed Swift <i>Apus pacificus</i>	1. Mod 2. Mod	1. Mod 2. Mod	1 & 2. Fork-tailed Swifts could forage in airspace above site and utilise habitat trees for nesting.
White-throated Needletail <i>Hirundapus caudacutus</i>	1. Mod 2. Mod	1. Mod 2. Mod	Migrates overseas to breed. 1 & 2. Fork-tailed Swifts could forage in airspace

Species relevant to PCT 79 & 295	Habitat suitability within project site 1. BESS Area 2. Road Intersection	Likelihood of being present	Justification
			above site and utilise habitat trees for nesting.
Yellow Wagtail <i>Motacilla flava</i>	1. Mod 2. Mod	1. Mod 2. Mod	Migrates overseas to breed. 1. Yellow Wagtails could utilise disturbed grassy rocky riparian zones. 2. Yellow Wagtails could utilise some habitat from gully draining to culvert under road.
Common Sandpiper <i>Actitis hypoleucos</i>	1. Low 2. Low	1. Low 2. Low	Migrates overseas to breed. 1 & 2. No suitable wading habitat onsite.
Sharp-tailed Sandpiper <i>Calidris acuminata</i>	1. Low 2. Low	1. Low 2. Low	Migrates overseas to breed. 1 & 2. No suitable wading habitat onsite.
Curlew Sandpiper <i>Calidris ferruginea</i>	1. Low 2. Low	1. Low 2. Low	Migrates overseas to breed. 1 & 2. No suitable wading habitat onsite.
Pectoral Sandpiper <i>Calidris melanotos</i>	1. Low 2. Low	1. Low 2. Low	Migrates overseas to breed. 1 & 2. No suitable wading habitat onsite.
Latham's Snipe <i>Gallinago hardwickii</i>	1. Low 2. Low	1. Low 2. Low	Migrates overseas to breed. 1 & 2. No suitable wading habitat onsite.

4.1.2. BioNet

A BioNet search was completed on 24th April 2025 (Appendix B). Twenty threatened species have been recorded within 10 km of the Project Site. The results of the BioNet search are summarised in Table 4-6 below.

Table 4-6 Results from NSW Bionet Atlas search within a 10km radius of the project site.

Common Name	Scientific Name	Records within 10km	Distance to closest record	Likelihood of presence inside project site 1. BESS Area 2. Road Intersection
Rosenberg's Goanna	<i>Varanus rosenbergi</i>	9	0.5km NW	1. Moderate – might traverse through the project site but not likely to forage or breed onsite due to lack of forest and absence of termite mounds. 2. Moderate – might traverse through the project site but not likely to forage or breed onsite due to lack of forest and absence of termite mounds.
White-throated Needletail	<i>Hirundapus caudacutus</i>	3	4.5km NW	Migratory does not breed in Australia. 1. Low - Might utilise airspace above project site for foraging only. 2. Moderate – might utilise airspace above project site and may forage/nest in trees.
Spotted Harrier	<i>Circus assimilis</i>	1	3.6km NW	1. Moderate – Might traverse project site when foraging for ground dwelling prey and may utilise large remnant River Red Gums for perching. No stick nests observed in four large remnant eucalypts onsite. 2. Moderate – Might forage for ground dwelling prey.
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	1	2.1km W	1. Moderate – Might traverse project site when foraging for ground dwelling prey and may utilise large remnant River Red Gums for perching. No stick nests observed in four large remnant eucalypts onsite.

Common Name	Scientific Name	Records within 10km	Distance to closest record	Likelihood of presence inside project site 1. BESS Area 2. Road Intersection
				2. Moderate – Might forage through the area and utilise trees for perching.
Black Falcon	<i>Falco subniger</i>	8	1.6km NW	1. Moderate – Might traverse project site when foraging for ground dwelling prey and may utilise large remnant River Red Gums for perching. No stick nests observed in four large remnant eucalypts onsite. 2. Moderate - Might traverse project site when foraging for ground dwelling prey and may utilise trees for perching. No stick nests observed.
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	1	2.4km SW	1. Low - No wetland or suitable wading habitat inside project site. 2. Low to Moderate – Localised wet area seeping out from hill with Phragmites.
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	20	Obs. onsite 1.5km N	1. High – Likely to utilise trees for foraging. There are hollows present in three large tall remnant River Red Gums on site. 2. High - Likely to utilise trees for foraging. There are hollows present in one E. Dives on site.
Pilotbird	<i>Pycnoptilus floccosus</i>	3	5.7km SW	1. Low – No remnant dry or wet sclerophyll forest/woodland inside project site. 2. Moderate – Some dry sclerophyll forest and woodland habitat at road intersection.
Varied Sittella	<i>Daphoenositta chrysoptera</i>	1	1.76km N	1. Low - No remnant forest/woodland inside project site. 2. Moderate – Some dry sclerophyll forest/woodland at road intersection.

Common Name	Scientific Name	Records within 10km	Distance to closest record	Likelihood of presence inside project site 1. BESS Area 2. Road Intersection
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	4	1.7km N	1. Moderate – Might traverse project site when foraging and may utilise large remnant River Red Gums for perching but likely to migrate for breeding. 2. Moderate – Might traverse project site when foraging and may utilise forest and woodland trees for perching.
Flame Robin	<i>Petroica phoenicea</i>	4	2km NW	1. Moderate – Although there are open areas onsite there is a lack of native groundcover and other foraging habitat resources. Species could utilise cleared paddocks during winter. 2. Moderate – Forest and woodland habitat present at intersection forming potential foraging/breeding habitat.
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	1	7.7km NW	1. Low – May traverse across the site but there is a lack of habitat resources including rocky outcrops, remnant vegetation and hollow logs onsite. 2. Moderate – Forest and woodland habitat present at intersection forming potential foraging habitat. Unlikely to breed due to edge disturbances from road.
Eastern Pygmy-Possum	<i>Cercartetus nanus</i>	3	2.3km NW	1. Low – There is no box, or ironbark woodland onsite. No heath, rainforest habitat. Cleared agricultural landscape. 2. Moderate – Presence of some woodland and forest habitat with a hollow bearing tree.
Yellow-bellied Glider	<i>Petaurus australis</i>	3	9.6km SE	1. Low – Lack of remnant forest inside project site. 2. Moderate – Presence of some woodland and forest which connects onto more extensive remnants.

Common Name	Scientific Name	Records within 10km	Distance to closest record	Likelihood of presence inside project site 1. BESS Area 2. Road Intersection
Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis</i>	6	1.2km N	1. Moderate – Could potentially roost in hollow bearing trees. Could forage for flying insects around remnant trees. 2. Moderate – Could potentially roost in hollow bearing trees. Could forage for flying insects around woodland/forest.
Austral Toadflax	<i>Thesium australe</i>	1	8.3km N	1. Low – Lack of native groundcover onsite. Refer to 100m transects Table 4-8 below. 2. Moderate – Presence of some native grasslands along M2 Power Station Road.

4.1.3. State vegetation mapping

The State Vegetation Type Mapping maps three PCTs within 1km of the project site and road intersection between Alpine Way and M2 Power Station Rd. These are:

- PCT 79 River Red Gum shrub/grass riparian tall woodland or open forest wetland mainly in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion. This PCT has been mapped along watercourses close to the project site.
- PCT 295 Robertsons Peppermint - Broad-leaved Peppermint - Nortons Box - stringybark shrub-fern open forest of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion. This PCT has been mapped in the steeper gullies and foot slopes surrounding the project site
- PCT 278 Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion. This PCT is mapped in conjunction with PCT 79 along watercourses close to the project site.

4.2. Landscape

4.2.1. Site description

The Project Site is located on the western lower slopes and foothills of the Great Dividing Range which adjoins onto steeper forested vegetation of Kosciuszko National Park (see Figure 4-2). The main land use within the locality is agriculture, mostly grazing of sheep and cattle. Agriculture has modified a lot of Box Gum Woodland within the broad sweeping areas of Khancoban valley which appears to be dominated by Blakely's Red Gum (*Eucalyptus. blakelyi*) and Yellow Box (*E. melliodora*) on the foot slopes with River Red Gum (*E. camaldulensis*) along waterways and floodplains. There has been much modification of groundcover locally with a lot of pasture improvement observed.

4.2.2. IBRA subregion

The project site occurs inside the NSW South-Western Slopes IBRA Region and the Inland Slopes Subregion (Figure 4-2). It's characterised by extensive areas of foothills and isolated ranges comprising the lower inland slopes of the Great Dividing Range which extend from north of Cowra through southern NSW into Western Victoria. This bioregion is characterized by sub-humid climate characterized by hot summers and no dry season. It includes parts of the Murray, Murrumbidgee, Lachlan and Macquarie River catchments (DCCEEW, 2025)

4.2.3. Mitchell landscapes

The project site occurs in the 'Khancoban Basin' Mitchell Landscape (Figure 4-2). This Landscape comprises lower basins with undulating hills on deeply weathered granite and intersected by deep alluvium on terraces and floodplains of the Swampy Plains River. Elevation ranges from 400-500m. River red gums (*E camaldulensis*) occur along riparian areas with Yellow Box (*E melliodora*) occupying lower slopes extending to Red Stringybark and eucalypt species associated with mountainous environment (DCCEEW, 2024)

4.2.4. National parks

The boundary of Kosciuszko National Park is 70m away from the project site which encompasses the steeper vegetated habitat surrounding north and east (Figure 4-2).

4.3. Aquatic habitat

4.3.1. Watercourses

There is a first order unnamed watercourse on the southern boundary of the project site. It was dry at the time of survey (March 2025) and parts of the watercourse were not incised and were more representative of a broad flat drainage depression. There is a highly disturbed unmapped drainage depression (see Figure 4-2 below) running into the center of the project site which then flows into a dam.

The Road intersection is located within steep foothills and has a steep gully and perched water table seeping out on top of a large batter along the Alpine Way.

4.3.2. Dams

There are two dams inside the project site (Figure 4-1). None appeared to have any emergent vegetation and looked to be highly disturbed from stock regularly accessing the cleared water course and dam.

4.3.3. Wetlands

Kosciuszko Alpine Fens, Bogs and Lakes are listed as Nationally Important Wetlands however there is no association of this wetland (in high elevation parts of the National Park) within the Murray BESS project site.

Locally, there are highly modified wetlands where Swampy Plain River flows into Khancoban pondage, about 3km away. When viewing aerial imagery, tree canopies appear bright green which is likely to indicate presence of exotic trees species like Black Willow (*Salix nigra*).

4.3.4. Key fish habitat (KFH)

There is no Key Fish Habitat mapped within or close to the Project site.



Figure 4-1 Examples of aquatic habitat. Left – minor drainage line, Right – Farm dam.

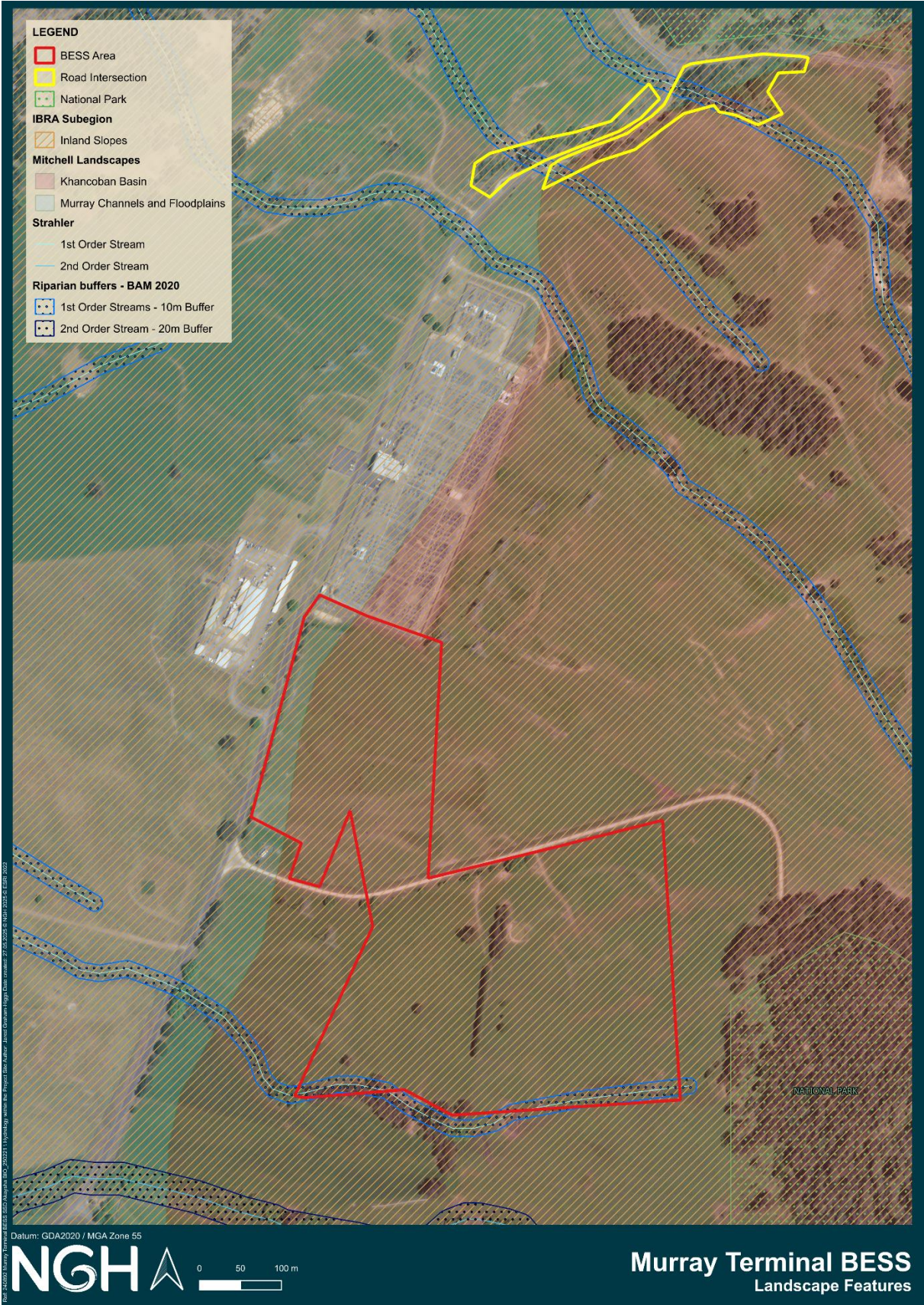


Figure 4-2 Landscape Features within the Project Site

4.4. Vegetation

4.4.1. Plant community types

Three plant community types (PCTs) were identified inside the project site. One within the BESS area, this is;

- PCT 79 *River Red Gum shrub/grass riparian tall woodland or open forest wetland mainly in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion* which is highly modified comprised of only scattered trees and representative planted vegetation.

Two PCTs were identified at the road intersection;

- PCT 295 *Robertsons Peppermint - Broad-leaved Peppermint - Nortons Box - stringybark shrub-fern open forest of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion* and
- PCT 278 *Riparian Blakely's Red Gum – box – shrub – sedge – grass tall open forest of the central NSW South Western Slopes Bioregion*

A small portion of the NSW Listed Threatened Ecological Community (TEC) - *River Red Gum shrub/grass riparian tall woodland or open forest wetland mainly in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion* occurs along the M2 Power Station Road, aligning with PCT 278. Refer to Table 4-7 PCTs identified on site and TEC status. Refer to Figure 4-9 for mapping of PCTs.

Table 4-7 PCTs identified on site and TEC status

PCT Number	PCT Name	Condition	Associated EPBC Act listed TEC	Associated NSW listed TEC	Location & Approx. percentage cover 1. BESS Area 2. Road Intersection
79	River Red Gum shrub/grass riparian tall woodland or open forest wetland mainly in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion	Planted (Figure 4-7) Scattered Trees (Figure 4-5)	NA	NA	1. 3.0% 2. 0%
NA	Potential Category 1 Land OR highly modified 'low condition' PCT 79.	Low (Figure 4-6)	NA	NA	1. 87.4% 2. 0%

PCT Number	PCT Name	Condition	Associated EPBC Act listed TEC	Associated NSW listed TEC	Location & Approx. percentage cover 1. BESS Area 2. Road Intersection
295	Robertsons Peppermint - Broad-leaved Peppermint - Nortons Box - stringybark shrub-fern open forest of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	Moderate (Figure 4-3)	NA	NA	1. 0% 2. 4.6%
278	Riparian Blakely's Red Gum – box – shrub – sedge – grass tall open forest of the central NSW South Western Slopes Bioregion	Moderate condition	NA	<i>River Red Gum shrub/grass riparian tall woodland or open forest wetland mainly in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion</i>	1. 0% 2. 5.1%



Figure 4-3 Left PCT 295 (Main Rd intersection), Right remnant River Red Gum and planted trees (PCT 79)



Figure 4-4 Photos of PCT 278 either side of M2 Power Station Rd

PCT Justification

For the BESS Area, PCT 79 was chosen because:

- Remnant 'scattered' trees existing consist of large River Red Gums (*E. camaldulensis*),
- Presence of planted River Red Gum (*E. camaldulensis*) trees along the watercourse and as a shelter belt in the middle of the property,
- The BESS area contains brown clay loam soils and is on the foot slopes of terrain steeply ascending to the east and gradually descending to the west.
- Existing Statewide Vegetation Type Mapping of this PCT occurs along water courses close to the project site and has similar landscape attributes to the project site.

For the Road Intersection, two PCTs were chosen being:

- PCT 278 was chosen because of the presence of scattered Apple Box (*E. bridgesiana*). PCT 278 was the only locally mapped PCT (within 1km) to contain Apple Box and with matching landscape attributes being lower slopes and forested hills. Soils were colluvial eroded granites. Further investigation will be required to confirm correct PCT classification and it's possible that this vegetation is an ecotone with PCT 295.

- For the vegetation close to the corner of the intersection between Alpine Way and M2 Power Station Rd, PCT 295 was chosen because of the presence of Broad-leaved Peppermint (*E. dives*) dominating the canopy which is found in PCT 295. Groundcover was sparse onsite mainly consisting of leaf litter and fallen logs. Sparse Bracken (*Pteridium esculentum*) and Geranium (*Geranium solanderi*) were observed growing in the understory and are representative of this PCT.
- Soils were grey colluvial eroded granites and the site was steeply ascending down to box culverts draining under Alpine Way.
- PCT 295 is extensively mapped on the Statewide Vegetation Type Mapping and found to occur on steeper vegetated slopes with granite geology.

Overall, PCT identification was difficult due to the highly disturbed vegetation and lack of remnant species, especially for the BESS area. PCT identification may be updated following detailed vegetation survey and vegetation integrity plots of the site.

4.4.2. Threatened ecological communities (TECs)

NSW

Based on the site visit and PCT identification, one threatened ecological community (TEC) was found to occur at the road intersection. This is *White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions*.

Apple Box (*E. bridgesiana*) is associated with this TEC and was dominating the area. The shrub layer was dominated by Blackthorn (*Bursaria spinosa*) and there were native groundcovers including Kangaroo Grass (*Themeda triandra*) and Red grass (*Bothriochloa macra*). This patch of vegetation was located on a valley floor foot slope and soils comprised eroded granites, all of which are associated with the scientific committee determination description for this TEC.

Commonwealth

No Commonwealth listed TECs occur within the Project Site. PCT 278 is not associated 'White box - yellow box - Blakely's red gum grassy woodlands and derived native grasslands' because the site was dominated by Apple Box (*E. bridgesiana*) which is not a key indicator species for this TEC.

4.4.3. Scattered trees

There are four scattered trees located within the project site (Figure 4-5), three being large hollow bearing River Red Gums (*E. camaldulensis*) and the remaining tree also a River Red Gum without hollows. Three of the hollow bearing trees are less than 100m from existing planted trees. The remaining tree is isolated by more than 100m.



Figure 4-5 Examples of remnant River Red Gums inside the project site.

4.4.4. Non-native vegetation

The Road intersection does not contain any ‘non-native’ vegetation (i.e. all been classified to a PCT). The BESS area consists of 87% ‘non-native’ vegetation within areas devoid of tree cover. The following information is relevant:

- Transitional native vegetation regulatory mapping (NSW Govt 2025) classifies the entire BESS area as Category 1 land. To justify this, a Land Category Assessment Report is recommended to be completed in conjunction with any Biodiversity Development Assessment Report.
- Six 100m transects (Table 4-8 and Figure 4-9) have justified that BESS area groundcover ranges from 69-93% exotic species.
- Native species comprise between 0% and 6% groundcover and native species present are commonly found species and not representative of a PCT.
- The project site is not mapped as any PCT on the State Wide Vegetation Mapping (DCCEEW, n.d). All mapping is ‘PCT 0’ non-native vegetation.

Results of the transects are shown in Table 4-8 and

Table 4-9 below. Transects can be seen on Figure 4-9 below.

Table 4-8 Groundcover composition results from 100m Transects

Transect Number	Transect Result	Native forb/grass diversity (0.1ha patch)	PCT analysis	Biodiversity Constraint
T1	90% Exotic 1% Native 9% Bare	3 forbs 0 grass	Exotic, Potential Category 1 land	Low
T2	93% Exotic 2% Native 5% Bare	2 forbs 0 grass	Exotic, Potential Category 1 land	Low
T3	90% Exotic 1% Native 9% Bare	3 forbs 1 grass	Exotic, Potential Category 1 land	Low
T4	86% Exotic 3% Native 11% Bare	4 forbs 0 grass	Exotic, Potential Category 1 land	Low
T5	84% Exotic 0% Native 16% Bare	4 forbs 5 grasses	Exotic, Potential Category 1 land	Low
T6	69% Exotic 6% Native 25% Bare	3 forbs 4 grasses	Exotic, Potential Category 1 land	Low

Table 4-9 Floristic results from 100m Transects (0.1ha patch)

Transect 1	Transect 2	Transect 3	Transect 4	Transect 5	Transect 6
NATIVES <i>Dysphania pumilio</i> <i>Portulaca oleracea</i> <i>Rumex brownii</i>	NATIVES <i>Dysphania pumilio</i> <i>Rumex brownii</i>	NATIVES <i>Cynodon dactylon</i> <i>Dysphania pumilio</i> <i>Portulaca oleracea</i> <i>Rumex brownii</i>	NATIVES <i>Dysphania pumilio</i> <i>Lythrum hyssopifolia</i> <i>Portulaca oleracea</i> <i>Rumex brownii</i>	NATIVES <i>Carex spp.</i> <i>Cynodon dactylon</i> <i>Eragrostis brownii</i> <i>Juncus filicaulis</i> <i>Juncus usitatus</i> <i>Dysphania pumilio</i> <i>Hypericum</i> <i>Lythrum hyssopifolia</i> <i>Portulaca oleracea</i> <i>Rumex brownii</i>	NATIVES <i>Carex spp.</i> <i>Cynodon dactylon</i> <i>Juncus filicaulis</i> <i>Juncus usitatus</i> <i>Dysphania pumilio</i> <i>Hypericum</i> <i>gramineum</i> <i>Portulaca oleracea</i>
EXOTICS <i>Agrostis capillaris</i> <i>Arctotheca</i> <i>calendula</i> <i>Brassica nigra</i> <i>Bromus rubens</i> <i>Conyza parva</i> <i>Digitaria sanguinalis</i> <i>Eleusine tristachya</i> <i>Hypochaeris</i> <i>radicata</i> <i>Lolium perenne</i> <i>Lysimachia arvensis</i> <i>Malva neglecta</i> <i>Paspalum dilatatum</i> <i>Plantago lanceolata</i> <i>Polygonum aviculare</i> <i>Silybum marianum</i> <i>Trifolium campestre</i> <i>Trifolium</i> <i>subterraneum</i>	EXOTICS <i>Acetosella vulgaris</i> <i>Agrostis capillaris</i> <i>Arctotheca</i> <i>calendula</i> <i>Brassica nigra</i> <i>Conyza parva</i> <i>Digitaria sanguinalis</i> <i>Eleusine tristachya</i> <i>Hypochaeris</i> <i>radicata</i> <i>Lolium perenne</i> <i>Lysimachia arvensis</i> <i>Paspalum dilatatum</i> <i>Phytolacca octandra</i> <i>Plantago lanceolata</i> <i>Polygonum aviculare</i> <i>Trifolium</i> <i>subterraneum</i>	EXOTICS <i>Acetosella vulgaris</i> <i>Agrostis capillaris</i> <i>Arctotheca</i> <i>calendula</i> <i>Brassica nigra</i> <i>Conyza parva</i> <i>Digitaria sanguinalis</i> <i>Eleusine tristachya</i> <i>Hypochaeris</i> <i>radicata</i> <i>Lolium perenne</i> <i>Lysimachia arvensis</i> <i>Paspalum dilatatum</i> <i>Plantago lanceolata</i> <i>Polygonum aviculare</i> <i>Trifolium repens</i>	EXOTICS <i>Agrostis capillaris</i> <i>Arctotheca</i> <i>calendula</i> <i>Conyza parva</i> <i>Digitaria sanguinalis</i> <i>Hypochaeris</i> <i>radicata</i> <i>Lolium perenne</i> <i>Lysimachia arvensis</i> <i>Mentha pulegium</i> <i>Paspalum dilatatum</i> <i>Polygonum aviculare</i> <i>Trifolium</i> <i>subterraneum</i>	EXOTICS <i>Agrostis capillaris</i> <i>Arctotheca</i> <i>calendula</i> <i>Digitaria sanguinalis</i> <i>Eleusine tristachya</i> <i>Hypochaeris</i> <i>radicata</i> <i>Paspalum dilatatum</i> <i>Plantago lanceolata</i>	EXOTICS <i>Agrostis capillaris</i> <i>Arctotheca</i> <i>calendula</i> <i>Cirsium vulgare</i> <i>Conyza parva</i> <i>Digitaria sanguinalis</i> <i>Hypochaeris</i> <i>radicata</i> <i>Lysimachia arvensis</i> <i>Paspalum dilatatum</i> <i>Plantago lanceolata</i> <i>Setaria parviflora</i> <i>Trifolium repens</i>



Figure 4-6 Examples of exotic groundcover surveyed inside the project site

4.4.5. Planted Native Vegetation

Less than 2% of the project site is planted native vegetation as defined under the BAM 2020. This includes two patches of planted River Red Gums (*E. camaldulensis*) along the southern boundary of the project site. (one patch has 102 trees, the other has 12 trees). The average Diameter at Breast Height (DBH) of these

trees ranges from 15-60cm and none have developed any hollows). There is also a small patch of 33 River Red Gums, (DBH ranging from 15-33cm with no hollows), planted in the middle of the project site (Figure 4-7).



Figure 4-7 Planted River Red Gums (left) in minor watercourse and (right) in centre of property.

4.4.6. Planted Exotic Vegetation

About 2% of the project site consists of planted exotic vegetation being a line of 30 Cypress trees (*Cupressus* spp.) in the middle of the project site and three planted Claret Ash (*Fraxinus angustifolia*). There are also three mature and eight immature Black Willows (*Salix nigra*) along the access track (between BESS area and substation) and eight Purple Willow sapling/thickets (*Salix purpurea*). None of the exotic trees had any observed hollows (Figure 4-8).



Figure 4-8 Examples of exotic planted trees inside the project site



Figure 4-9 Vegetation Mapping, TECs, Transects and Habitat Features within the Project Site

4.5. Threatened species

4.5.1. Threatened species habitat

Threatened species habitat within the project site comprises;

- Remnant trees, including three senescent hollow bearing and one non-hollow bearing River Red Gums (*E camaldulensis*) that provide hollows and nectar and roosting sites for wildlife. There are 135 planted River Red gums within the minor watercourse and within the center of the project site (Figure 4-7)
- Disturbed woodland and forest habitat within the road intersection. One hollow-bearing tree is present in forest (PCT 295) and appeared to contain some smaller hollows.
- Planted exotic trees include conifers, willows and claret ash trees which provide roosting habitat for highly mobile wildlife.
- Farm dams and ephemeral watercourses providing water resources. The dry cleared watercourse contains some embedded stones as can be seen in Figure 4-1.
- Grazed exotic grasslands.

4.5.2. Threatened species records and site observations

Three Gang-gang Cockatoos were observed flying over the site as well as landing in the planted and exotic trees. Refer to Figure 4-7 illustrating typical habitat observed being used by Gang-gang Cockatoo.

There are a total of four hollow-bearing trees inside the project site with three remnant River Red gums harboring multiple hollows inside the BESS area and one Broad-leaved Peppermint (*E. dives*) on the road intersection harboring a few smaller hollows. All hollow bearing trees could form suitable habitat for hollow dependent threatened species.

In terms of existing Bionet records, Rosenberg's Goanna (*Varanus rosenbergi*) was recorded alongside the Murray substation along the M2 Power Station Rd. No suitable breeding habitat (i.e. termite mounds where they lay their eggs) were observed inside the project site (including road intersection) but it may be possible that the species may reside in the hills surrounding the project site and may traverse the project site from time to time. There are not many foraging opportunities for this species inside the project site and would be unlikely to rely on the habitat within the project site.

The site may also be used by Raptors like Black Falcon (*Falco subniger*) when foraging for small mammals utilising grassland onsite and landing in the larger trees. All trees were inspected for stick nests during the site inspection and no large stick nests were observed at the time of survey.

The remnant vegetation at the intersection between Alpine Way and the M2 Power Station Rd is likely to provide habitat opportunities for a range of species that rely on forested vegetation including Varied Sittella (*Daphoenositta chrysoptera*) which could utilise the bark on eucalypts and reside in the thick midstory of Blackthorn (*Bursaria spinosa*) and Tree Violet (*Melicytus dentatus*).

4.5.3. Predicted candidate species (BAM-C)

The BAM calculator (BAM-C) was used to identify predicted ecosystem and candidate species that would need further assessment within a Biodiversity Development Assessment Report (BDAR). Candidate species may require targeted surveys as part of the BDAR to determine their presence, unless they can be ruled out due to habitat or geographic constraints as defined in the BAM-C or their habitat can be avoided from development.

A list of predicted and candidate species associated with PCT 79, 278 and 295 can be found in Appendix C to E.

4.6. Priority weeds

The following priority weeds have been identified within the project site (Table 4-10). Priority weeds are listed under the *NSW Biosecurity Act 2015*. The project site is located within the Murray Local Land Service Region.

Table 4-10 Priority Weeds observed to exist inside the project site

Common Name	Scientific Name	Abundance across project site	Legal obligation
Blackberry	<i>Rubus fruticosus</i> <i>species aggregate</i>	Occasional/sparse	Land managers should reduce the impact of the plant on assets of high economic, environmental and/or social value. General biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.
Briar	<i>Rosa rubiginosa</i>	Occasional/sparse	General biosecurity duty to prevent, eliminate or minimise spread. Duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.
Black Willow	<i>Salix nigra</i>	Distributed along access track into project site and along watercourses south of project site	Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not buy, sell, grow, move, carry or release the plant. Notify local control authority if found. General biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.
Fleabane	<i>Conyza species</i>	Occasional/sparse	General biosecurity duty to prevent, eliminate or minimise any biosecurity risk

			<i>they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.</i>
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Figure 4-10 Examples of common weeds inside the project site (left Blackberry, right Willows)

5. Biodiversity assessment requirements

In NSW, large scale energy storage projects, such as battery energy storage systems (BESS's), are considered State Significant Development (SSD) and the Biodiversity Offsets Scheme (BOS) would apply to the Project. The SEARs will require that a BDAR be prepared in accordance with the BAM pursuant to the NSW BC Act. The BDAR must:

- Demonstrate how impacts have been avoided, mitigated and offset as a last resort. The constraints mapping provided in this report and other logistical factors should be scrutinised to ensure that the final impact areas presented have avoided the higher quality woodland, to avoid impacts on key biodiversity constraints as much as possible, namely:
 - Threatened species habitat
 - TECs (NSW Box Gum Woodland at M2 Power Station Road)
 - Watercourses and farm dams
 - Hollow-bearing and remnant trees
- Consider Serious and Irreversible Impact (SAIL) entities which are entities most at risk of extinction that could be impacted by the development. If a SAIL is determined by an approval authority, the proposal cannot be approved unless overruled by the Minister. Key risks for the proposal here relate to the loss of small populations or ongoing collision impacts to threatened species listed as SAIL. The identified NSW Box Gum Woodland PCT 278 TEC and habitat for Regent Honeyeater, Mauve Burr Daisy are examples of entities at risk of SAIL and all measures should be considered to avoid impacts.
- Consider prescribed impacts which are impacts that cannot be quantified through the BAM-C , resulting from the proposed development; in this case, resulting from impacts on:
 - the habitat of threatened entities including:
 - karst, caves, crevices, cliffs, rocks and other geological features of significance, hollow-bearing trees, or
 - human-made structures, or
 - non-native vegetation
 - areas connecting threatened species habitat, such as movement corridors, or remnant hollow-bearing trees
 - water quality, water bodies and hydrological processes that sustain, threatened entities (including from subsidence or upsidence from underground mining),
 - threatened species or fauna that are part of a TEC from vehicle strikes.

As part of the BAM process, detailed ecological surveys and further investigation and assessment would be undertaken including:

- Field validation of vegetation community mapping
- Floristic plot data (to confirm the PCTs, their condition and distribution)
- Targeted surveys for candidate threatened species (generated by the SEARs and BAM process)
- Recommendations to avoid and minimise impacts
- Biodiversity offset calculations to determine the offset obligation of the final proposal
- Biodiversity offset planning, to ensure the offset obligation can be met.

6. Biodiversity Values

Biodiversity values at the Project Site were identified during field surveys. Potential biodiversity impacts have been classified into three biodiversity values categories (i.e., high, medium and low) and mapped where possible based on our experience in this sector, with buffers applied where necessary. At this preliminary stage these results should be considered as high-level guidance and may be refined following more detailed field assessment.

Areas mapped as high value within Figure 6-1 do not represent areas that would stop a major project or SSD approval, however, may result in associated costs to offset these impacts. Overall, where trees are present, it is recommended that impact to these areas be avoided or minimised as much as possible to reduce biodiversity impacts, especially for large hollow bearing, remnant River Red Gums onsite.

It is recommended that additional buffers are applied to areas of high biodiversity value such as riparian areas and habitat trees.

6.1. High values (red on map below)

- Threatened Ecological Communities – Box-gum Woodland (BC Act and EPBC Act)
- Large senescent hollow-bearing paddock or remnant trees (15m radius from trunk)
- SAI entities are unable to be mapped at this early stage until targeted surveys have been completed.

6.2. Moderate values (yellow on map below)

- All remnant non-hollow bearing paddock trees not aligning to a TEC
- Planted native vegetation with or without hollows and fissures
- Watercourse buffers in accordance with Strahler stream order buffers
- Rocky outcrops.

6.3. Low values (green on map below)

- Exotic dominated paddocks including historically cultivated areas with low potential for threatened species occurrence. This includes planted exotic and cultivated areas.
- Farm dams with exotic vegetation cover, bare ground and lack emergent reeds.
- Exotic planted vegetation without hollows or fissures.
- Established public roads and farm access tracks that do not contain any live groundcover.



Figure 6-1 Constraints Mapping

7. Conclusion

This Biodiversity Technical Report combines desktop biodiversity results with data collected during the initial biodiversity field visit for the proposed Murray BESS Project Site and Intersection between Alpine Way and M2 Power Station Road. A series of rapid assessments and 100m transects were conducted to collect information about groundcover floristics and cover, map native vegetation and identify biodiversity constraints across the Project Site.

In relation to the BESS project site and the M2 Power Station Rd intersection, three PCTs were identified, being:

- **BESS Area, PCT 79** – *River Red Gum shrub/grass riparian tall woodland or open forest wetland mainly in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion and,*
- **Road Intersection, PCT 295** – *Robertsons Peppermint - Broad-leaved Peppermint - Nortons Box - stringybark shrub-fern open forest of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion.*
- **Road Intersection, PCT 278** - *Riparian Blakely's Red Gum – box – shrub – sedge – grass tall open forest of the central NSW South Western Slopes Bioregion.*

PCT 79 was mapped where River Red Gums (*Eucalyptus camaldulensis*) have been planted inside the project site (along a watercourse and in the centre of a paddock) as well as three large senescent hollow bearing River Red gums and one other senescent non-hollow bearing River Red Gum which are the most important habitat feature onsite.

PCT 295 was mapped where remnant native vegetation was found at the corner of the intersection between Alpine Way and M2 Power Station Rd. One habitat tree (*E. dives*) was observed inside this area.

PCT 278 was mapped alongside the M2 Power Station Rd. This PCT classifies as NSW *White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions.*

No areas within the Project Site contained significant rocky outcrops suitable for threatened lizards except for some minor rocks fringing an unmarked watercourse flowing into a dam onsite (Refer to Figure 4-1 Examples of aquatic habitat. Left – minor drainage line, Right – Farm dam.

A Project assessed under the BAM should demonstrate that the avoidance of impacts has been prioritised. Mitigation strategies and offset generation should be applied only after no further avoidance is possible. For a BESS development, avoidance of high constraint areas is considered highly feasible in response to further detailed survey results. Considerations likely to be included as the development is refined include:

- Buffering and avoidance of habitat for SAI entities, avoiding impacts to PCT 278 (Box Gum Woodland).
- Buffering and avoidance of key habitat features including HBTs and waterways,
- Buffering and avoidance of higher quality vegetation and TECs,
- Locating BESS footprint to avoid remnant hollow bearing trees and riparian zones and avoid removing native planted trees where possible.

Of the total 19.95 ha of the Project Site, approximately 1.29 ha is classified as having 'high' biodiversity value and 1.78 ha as 'moderate' biodiversity value with the remaining 16.88 ha classified as 'low' constraint. The

Development Footprint design should avoid or minimise impacts to high and moderate values as much as practical.

Land Category Assessment

Approximately 87% of the BESS site has been identified as potential Category 1 land (i.e. exotic) which would not require assessment under the BAM. This means that the exempt land would not need to be surveyed further, and no credit obligations would be generated. Confirmation of Category 1 land would be determined by undertaking a Land Category Assessment (LCA). A LCA has associated cost considerations as additional surveys and reporting will be required as well as time considerations to undertake these surveys and obtain approval from the Conservation Programs, Heritage and Regulation (CPHR, formerly BCS) which can be timely. Given the relatively small size of the BESS site and the low condition of vegetation on site, NGH is of the opinion that a LCA would not be a cost-effective approach compared to a BDAR.

If required by Akaysha, a cost comparison and benefits analysis can be undertaken under a variation.

Assuming a LCA is not pursued the next step is to undertake additional floristic and targeted surveys as part of the development of the BDAR during the EIS Phase. As indicated in Section 4.5.3, the BAM calculator (BAM-C) was used to identify predicted ecosystem and candidate species that would need further assessment under a BDAR. Candidate species may require targeted surveys as part of the BDAR to determine their presence, unless they can be ruled out due to habitat or geographic constraints as defined in the BAM-C or their habitat can be avoided from development. A list of predicted and candidate species associated with PCT 79, 278 and 295 can be found in Appendix C to E.

EPBC Referral

The need for an EPBC Act referral will be determined during the EIS phase. All relevant MNES that are likely to be present, would be included in targeted surveys with impacts reported upon and offset (where applicable) in the BDAR. The requirements for an EPBC Referral will be assessed following quantification of the impacts to all relevant listed entities. Early consultation with relevant authorities regarding impact thresholds to threatened entities, particularly SAIL candidates, is recommended.

8. References

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Appendix A EPBC Protected Matters Search Report



Australian Government

Department of Climate Change, Energy,
the Environment and Water

EPBC Act Protected Matters Report

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

Report created: 24-Jan-2025

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	2
Wetlands of International Importance (Ramsar	7
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	64
Listed Migratory Species:	8

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	16
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	2
Regional Forest Agreements:	2
Nationally Important Wetlands:	1
EPBC Act Referrals:	6
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places			[Resource Information]
Name	State	Legal Status	Buffer Status
Historic			
Snowy Mountains Scheme	NSW	Listed place	In feature area
Natural			
Australian Alps National Parks and Reserves	ACT	Listed place	In feature area

Wetlands of International Importance (Ramsar Wetlands)			[Resource Information]
Ramsar Site Name		Proximity	Buffer Status
Banrock station wetland complex		700 - 800km upstream from Ramsar site	In feature area
Barmah forest		200 - 300km upstream from Ramsar site	In feature area
Gunbower forest		300 - 400km upstream from Ramsar site	In feature area
Hattah-kulkyne lakes		500 - 600km upstream from Ramsar site	In feature area
Nsw central murray state forests		200 - 300km upstream from Ramsar site	In feature area
Riverland		600 - 700km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland		700 - 800km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities			[Resource Information]
For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.			
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.			
Community Name	Threatened Category	Presence Text	Buffer Status
Alpine Sphagnum Bogs and Associated Fens	Endangered	Community likely to occur within area	In buffer area only

Community Name	Threatened Category	Presence Text	Buffer Status
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community likely to occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species

[[Resource Information](#)]

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat may occur within area	In feature area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area
CRUSTACEAN			
Euastacus rieki Riek's Crayfish [83155]	Endangered	Species or species habitat may occur within area	In feature area
FISH			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bidyanus bidyanus Silver Perch, Bidyan [76155]	Endangered	Species or species habitat may occur within area	In buffer area only
Galaxias rostratus Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Maccullochella macquariensis Trout Cod [26171]	Endangered	Species or species habitat may occur within area	In buffer area only
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Macquaria australasica Macquarie Perch [66632]	Endangered	Translocated population known to occur within area	In feature area
Nannoperca australis Murray-Darling Basin lineage Southern Pygmy Perch (Murray-Darling Basin lineage) [91711]	Vulnerable	Species or species habitat may occur within area	In buffer area only
FROG			
Crinia sloanei Sloane's Froglet [59151]	Endangered	Species or species habitat may occur within area	In feature area
Litoria booroolongensis Booroolong Frog [1844]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Litoria raniformis Southern Bell Frog,, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat may occur within area	In feature area
Litoria spenceri Spotted Tree Frog [25959]	Critically Endangered	Species or species habitat known to occur within area	In feature area
INSECT			
Keyacris scurra Key's Matchstick Grasshopper [89739]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Synemon plana Golden Sun Moth [25234]	Vulnerable	Species or species habitat may occur within area	In feature area
MAMMAL			
Burramys parvus Mountain Pygmy-possum [267]	Endangered	Species or species habitat may occur within area	In buffer area only
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area	In feature area
Mastacomys fuscus mordicus Broad-toothed Rat (mainland), Tooarrana [87617]	Endangered	Species or species habitat likely to occur within area	In feature area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area	In feature area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat likely to occur within area	In feature area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area	In feature area
Pseudomys fumeus Smoky Mouse, Konoom [88]	Endangered	Species or species habitat likely to occur within area	In feature area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In feature area
PLANT			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat may occur within area	In feature area
Caladenia concolor Crimson Spider-orchid, Maroon Spider- orchid [5505]	Vulnerable	Species or species habitat may occur within area	In feature area
Calotis glandulosa Mauve Burr-daisy [7842]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Colobanthus curtisiae Curtis' Colobanth [23961]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diuris ochroma Pale Golden Moths [64565]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In feature area
Pimelea bracteata [8125]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
Prasophyllum bagoense Bago Leek-orchid [84276]	Critically Endangered	Species or species habitat may occur within area	In feature area
Prasophyllum petilum Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pterostylis oreophila Blue-tongued Orchid, Kiandra Greenhood [22903]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Ranunculus anemoneus Anemone Buttercup [14889]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Swainsona recta Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat may occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat known to occur within area	In feature area
Viola improcera Dwarf Violet [3879]	Endangered	Species or species habitat may occur within area	In buffer area only
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat may occur within area	In buffer area only
REPTILE			
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Cyclodomorphus praealtus Alpine She-oak Skink [64721]	Endangered	Species or species habitat may occur within area	In buffer area only
Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eulamprus kosciuskoi Alpine Water Skink [59693]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Liopholis guthega Guthega Skink [83079]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Liopholis montana Mountain Skink [87162]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Pseudemoia cryodroma Alpine Bog Skink, Alpine Bog-skink [84408]	Endangered	Species or species habitat may occur within area	In buffer area only
Listed Migratory Species [Resource Information]			
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

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

Commonwealth Land Name	State	Buffer Status
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [16449]		NSW
		In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Kosciuszko	National Park	NSW	In feature area
River Murray Reserve	Natural Features Reserve	VIC	In buffer area only

Regional Forest Agreements	[Resource Information]
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Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
North East Victoria RFA	Victoria	In buffer area only
Southern RFA	New South Wales	In feature area

Nationally Important Wetlands	[Resource Information]
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Wetland Name	State	Buffer Status
Kosciusko Alpine Fens, Bogs and Lakes	NSW	In buffer area only

EPBC Act Referrals	[Resource Information]
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Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Unicorn Molybdenum Copper Silver open pit mine	2013/6997	Controlled Action	Assessment Approach	In feature area
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Murray 1 Pressure Tunnel	2000/112	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Aerial baiting for wild dog control	2006/2713	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

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

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Appendix B Bionet Atlas Search Results

Entity	Records within 10km radius of project site
Artamus cyanopterus cyanopterus	4
Dusky Woodswallow	4
Calidris acuminata	1
Sharp-tailed Sandpiper	1
Callocephalon fimbriatum	20
Gang-gang Cockatoo	20
Cercartetus nanus	3
Eastern Pygmy-possum	3
Circus assimilis	1
Spotted Harrier	1
Daphoenositta chrysoptera	1
Varied Sittella	1
Dasyurus maculatus	1
Spotted-tailed Quoll	1
Falco subniger	8
Black Falcon	8
Falsistrellus tasmaniensis	6
Eastern False Pipistrelle	6
Haliaeetus leucogaster	1
White-bellied Sea-Eagle	1
Hirundapus caudacutus	3
White-throated Needletail	3
Miniopterus orianae oceanensis	6
Large Bent-winged Bat	6
Myotis macropus	1
Southern Myotis	1
Ninox strenua	1
Powerful Owl	1
Petaurus australis	3
Yellow-bellied Glider	3
Petroica phoenicea	4
Flame Robin	4
Pycnoptilus floccosus	3
Pilotbird	3
Thesium australe	1
Austral Toadflax	1
Varanus rosenbergi	9
Rosenberg's Goanna	9
Grand Total	77

Appendix C PCT 79 Predicted and Candidate Species List

CE – Critically Endangered

E – Endangered

V – Vulnerable

NL – Not Listed

Predicted Species common Name	Scientific Name	BC Act Listing status	EPBC Act Listing status
Regent Honeyeater	<i>Anthochaera phrygia</i>	CE	CE
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	E	E
South-eastern Glossy Black-Cockatoo	<i>Calyptorhynchus lathami lathami</i>	V	V
Little Pied Bat	<i>Chalinolobus picatus</i>	V	NL
Spotted Harrier	<i>Circus assimilis</i>	V	NL
Brown Treecreeper (Eastern subspecies)	<i>Climacteris picumnus victoriae</i>	V	V
Varied Sittella	<i>Daphoenositta chrysoptera</i>	V	NL
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	V	E
Black Falcon	<i>Falco subniger</i>	V	NL
Little Lorikeet	<i>Glossopsitta pusilla</i>	V	NL
Painted Honeyeater	<i>Grantiella picta</i>	V	V
Little Eagle	<i>Hieraaetus Morphnoides</i>	V	NL
Swift Parrot	<i>Lathamus discolor</i>	E	CE
Square-tailed Kite (foraging)	<i>Lophoictinia isura</i>	V	NL

South-eastern Hooded Robin	<i>Melanodryas cucullata cucullata</i>	E	E
Black-chinned Honeyeater	<i>Melithreptus gularis gularis</i>	V	NL
Turquoise Parrot	<i>Neophema pulchella</i>	V	NL
Yellow-bellied Glider	<i>Petaurus australis</i>	V	V
Scarlet Robin	<i>Petroica boodang</i>	V	NL
Flame Robin	<i>Petroica phoenicea</i>	V	NL
Superb Parrot (foraging)	<i>Polytelis swainsonii</i>	V	V
Australian Painted Snipe	<i>Rostratula australis</i>	E	E
Yellow-bellied Sheathtail-bat	<i>Saccolaimus flaviventris</i>	V	NL
Diamond Firetail	<i>Stagonopleura guttata</i>	V	V

CE – Critically Endangered

E – Endangered

V – Vulnerable

NL – Not Listed

Candidate Species Common Name	Scientific Name	BC Act Listing status	EPBC Act Listing status
Regent Honeyeater (breeding)	<i>Anthochaera phrygia</i>	CE	CE
Bush Stone-curlew	<i>Burhinus grallarius</i>	E	NL
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	E	E
South-eastern Glossy Black-Cockatoo (breeding)	<i>Calyptorhynchus lathami lathami</i>	V	V
Small Scurf-pea	<i>Cullen parvum</i>	E	NL
Little Eagle (breeding)	<i>Hieraaetus morphnoides</i>	V	NL
Swift Parrot (breeding)	<i>Lathamus discolor</i>	E	CE
Southern Bell Frog	<i>Litoria raniformis</i>	E	V
Square-tailed Kite (breeding)	<i>Lophoictinia isura</i>	V	NL
Southern Myotis	<i>Myotis Macropus</i>	V	NL
Barking Owl	<i>Ninox connivens</i>	V	NL
Powerful Owl	<i>Ninox strenua</i>	V	NL
Squirrel Glider	<i>Petaurus norfolcensis</i>	V	NL
Brush-tailed Phascogale	<i>Phascogale tapoatafa</i>	V	NL
Koala	<i>Phascolarctos cinereus</i>	E	E
Superb Parrot (breeding)	<i>Polytelis swainsonii</i>	V	V

Appendix D PCT 278 Predicted and Candidate Species List

CE – Critically Endangered

E – Endangered

V – Vulnerable

NL – Not Listed

Predicted Species Common Name	Scientific Name	BC Act Listing status	EPBC Act Listing status
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	V	NL
Gang-gang Cockatoo (foraging)	<i>Callocephalon fimbriatum</i>	E	E
Little Pied Bat	<i>Chalinolobus picatus</i>	V	NL
Speckled Warbler	<i>Chthonicola Picatus</i>	V	NL
Spotted Harrier	<i>Circus assimilis</i>	V	NL
Brown Treecreeper (eastern subspecies)	<i>Climacteris picumnus</i>	V	V
Varied Sittella	<i>Daphoenositta chrysoptera</i>	V	NL
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	V	E
Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis</i>	V	NL
Painted Honeyeater	<i>Grantiella picta</i>	V	V
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	V	NL
Little Eagle (foraging)	<i>Hieraaetus morphnoides</i>	V	NL
White-throated Needletail	<i>Hirundapus caudacutus</i>	V	V

Swift Parrot (foraging)	<i>Lathamus discolor</i>	E	CE
Square-tailed Kite (foraging)	<i>Lophoictinia isura</i>	V	NL
South-eastern Hooded Robin	<i>Melanodryas cucullata cucullata</i>	E	E
Black-chinned Honeyeater (eastern subspecies)	<i>Melithreptus gularis gularis</i>	V	NL
Large Bent-winged Bat (foraging)	<i>Miniopterus orianae oceanensis</i>	V	NL
Turquoise Parrot	<i>Neophema pulchella</i>	V	NL
Yellow-bellied Glider	<i>Petaurus australis</i>	V	V
Scarlet Robin	<i>Petroica boodang</i>	V	NL
Flame Robin	<i>Petroica phoenicea</i>	V	NL
Superb Parrot (foraging)	<i>Polytelis swainsonii</i>	V	V
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>	V	NL
Diamond Firetail	<i>Stagonopleura guttata</i>	V	V
Rosenberg's Goanna	<i>Varanus rosenbergi</i>	V	NL

Biodiversity Technical Report

Murray Terminal BESS



CE – Critically Endangered

E – Endangered

V – Vulnerable

NL – Not Listed

Candidate Species Common Name	Scientific Name	BC Act Listing status	EPBC Act Listing status
Pink-tailed Legless Lizard	<i>Aprasia parapulchella</i>	V	V
Small Pale Grass-lily	<i>Caesia parviflora</i> var. <i>minor</i>	E	NL
Gang-gang Cockatoo (breeding)	<i>Callocephalon fimbriatum</i>	E	E
Eastern Pygmy-possum	<i>Cercartetus nanus</i>	V	NL
Tumut Grevillea	<i>Grevillea wilkinsonii</i>	CE	CE
White-bellied Sea-Eagle (breeding)	<i>Haliaeetus leucogaster</i>	V	NL
Little Eagle (breeding)	<i>Hieraaetus morphnoides</i>	V	NL
Key's Matchstick Grasshopper	<i>Keyacris scurra</i>	E	E
Swift Parrot (breeding)	<i>Lathamus discolor</i>	E	CE
Booroolong Frog	<i>Litoria booroolongensis</i>	E	E
Square-tailed Kite (breeding)	<i>Lophoictinia isura</i>	V	NL
Large Bent-winged Bat (breeding)	<i>Miniopterus orianae oceanensis</i>	V	NL
Southern Myotis	<i>Myotis Macropus</i>	V	NL
Barking Owl	<i>Ninox connivens</i>	V	NL

Powerful Owl	<i>Ninox strenua</i>	V	NL
Southern Greater Glider	<i>Petauroides volans</i>	E	E
Squirrel Glider	<i>Petaurus norfolcensis</i>	V	NL
Koala	<i>Phascolarctos cinereus</i>	E	E
Superb Parrot (breeding)	<i>Polytelis swainsonii</i>	E	E

Appendix E PCT 295 Predicted and Candidate Species List

Predicted Species Common Name	Scientific Name	BC Act Listing status	EPBC Act Listing status
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	V	NL
Gang-gang Cockatoo (foraging)	<i>Callocephalon fimbriatum</i>	E	E
Varied Sittella	<i>Daphoenositta chrysoptera</i>	V	NL
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	V	E
Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis</i>	V	NL
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	V	NL
Little Eagle (foraging)	<i>Hieraaetus morphnoides</i>	V	NL
White-throated Needletail	<i>Hirundapus caudacutus</i>	V	V
Swift Parrot (foraging)	<i>Lathamus discolor</i>	E	CE
Square-tailed Kite (foraging)	<i>Lophoictinia isura</i>	V	NL
Large Bent-winged Bat (foraging)	<i>Miniopterus orianae oceanensis</i>	V	NL
Scarlet Robin	<i>Petroica boodang</i>	V	NL
Flame Robin	<i>Petroica phoenicea</i>	V	NL
Diamond Firetail	<i>Stagonopleura guttata</i>	V	V

Rosenberg's Goanna	<i>Varanus rosenbergi</i>	V	NL
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CE – Critically Endangered

E – Endangered

V – Vulnerable

NL – Not Listed

Candidate Species Common Name	Scientific Name	BC Act Listing status	EPBC Act Listing status
Small Pale Grass-lily	<i>Caesia parviflora var. minor</i>	E	NL
Gang-gang Cockatoo (breeding)	<i>Callocephalon fimbriatum</i>	E	E
Eastern Pygmy-possum	<i>Cercartetus nanus</i>	V	NL
White-bellied Sea-Eagle (breeding)	<i>Haliaeetus leucogaster</i>	V	NL
Little Eagle (breeding)	<i>Hieraaetus morphnoides</i>	V	NL
Swift Parrot (breeding)	<i>Lathamus discolor</i>	E	CE
Booroolong Frog	<i>Litoria booroolongensis</i>	E	E
Large Bent-winged Bat (breeding)	<i>Miniopterus orianae oceanensis</i>	V	NL
Southern Myotis	<i>Myotis Macropus</i>	V	NL
Barking Owl	<i>Ninox connivens</i>	V	NL
Powerful Owl	<i>Ninox strenua</i>	V	NL
Southern Greater Glider	<i>Petauroides volans</i>	E	E
Koala	<i>Phascolarctos cinereus</i>	E	E

Superb Parrot (breeding)	<i>Polytelis swainsonii</i>	E	E
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