



Flora and Fauna Assessment Report

259 Windermere Road, Windermere NSW 2321

HBT0015_FFAR_V1.0

27/09/2022



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Document No: HBT0015_FFAR_V1.0

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NewPro 27 c/o Perception Planning

Prepared by

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1 Introduction

1.1 Background

Habitat Environmental Services Pty Ltd (Habitat) was engaged by NewPro 27 c/o Perception Planning to prepare a Flora and Fauna Assessment Report (FFAR) to support the proposed development of part of Lot 1902 (DP 1112961), located at 259 Windermere Road, Windermere NSW 2321, as shown in **Figure 1**. The project will be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The following terms are used throughout this report:

- Study Area: Lot 1902 (DP 1112961), located at 259 Windermere Road, Windermere NSW 2321.
- Subject Site: The area in the southern portion of the Study Area proposed for development.
- Locality: Land within a 10-kilometre (km) radius of the Study Area.

1.2 Site Description

The Study Area is approximately 47.51 hectare (ha) and is located within the township of Windermere, approximately 30 km northwest of the city of Newcastle (**Figure 1**). Windermere occurs within the City of Maitland Local Government Area (LGA). Three land zonings under the Maitland Local Environmental Plan (LEP 2011) apply to the Study Area:

- The northern portion is zoned *RU1 Primary Production*.
- The southern portion (where development is proposed) is zoned *R1 General Residential*.
- A small area in the south-eastern corner (associated with Lochinvar Creek) is zoned *C3 Environmental Management*.

The Study Area lies within a rural landscape and the surrounding lands are predominantly agricultural. A narrow strip of riparian vegetation is associated with Lochinvar Creek, which flows through the eastern portion of the Study Area in a northern direction. Entry to the Study Area is achieved via Windermere Road, which adjoins the western boundary.

The Subject Site is approximately 8.84 ha and lies within the *R1 General Residential* zoned area in the southern portion of the Study Area (**Figure 2**). The site is vegetated throughout with grasslands. No trees or shrubs occur.

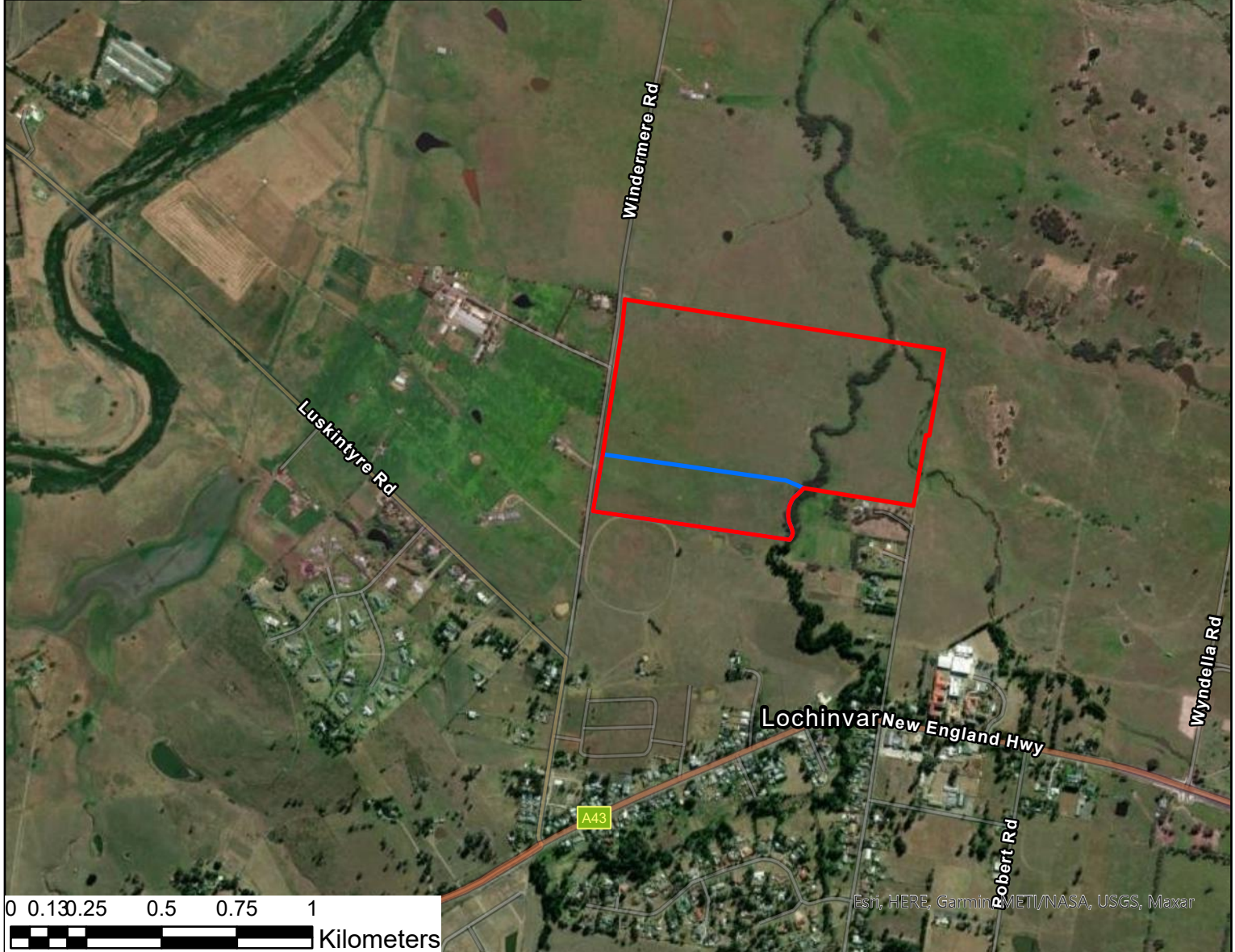
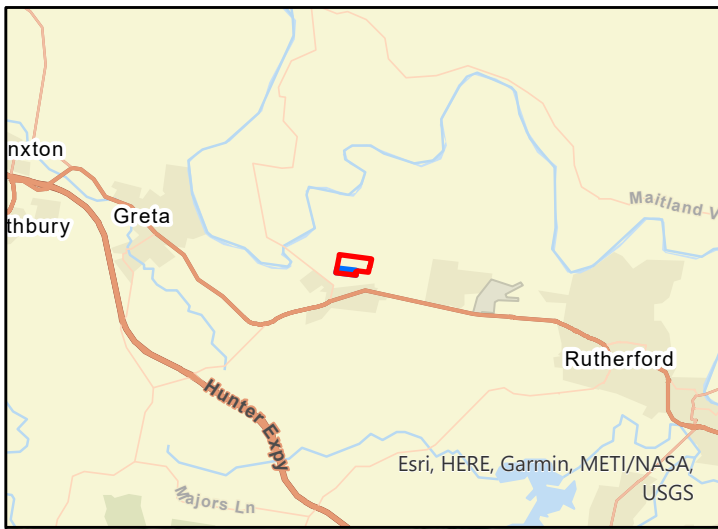




Figure 1 - Locality Map



Legend

 Study Area (Lot 1902 DP 1112961)

 Subject Site

1.3 Proposed Development

Approval for a one (1) into ninety-six (96) Lot Torrens Title subdivision, including civil works (road extensions, stormwater connection and associated earthworks) will be sought from Maitland City Council via a Development Application (DA). A drainage reserve and detention basin will be constructed in the eastern portion of the site.

The layout of the proposed development is shown in **Figure 2**.

1.4 Report Objectives

The objectives of the FFAR are as follows:

- Describe the biodiversity values and landscape features present within the Subject Site.
- Identify native vegetation, noting the extent and condition of Plant Community Types (PCTs), and the presence, condition and extent of any Threatened Ecological Communities (TECs).
- Assess the relevance and value of the Subject Site for threatened species and ecological communities (and their habitats) listed under the NSW *Biodiversity Conservation Act 2016* (BC Act).
- Assess the potential impacts of the proposed development on threatened species and ecological communities, pursuant to Section 7.3 of the BC Act (5-part test).
- Comment on the likely occurrence and relevance of matters of national environmental significance listed under the *Commonwealth Environment Planning and Biodiversity Conservation Act 1999* (EPBC Act).
- Describe steps to avoid and mitigate any identified impacts on biodiversity values and to protect the natural environment.



Figure 2 - Subject Site and Proposed Development



Legend

- Study Area
- Subject Site
- Development Layout
- Drainage Reserve (13,408m)
- Detention Basin
- Boundary (R1 Zone & E3 Zone)

2 Legislative Context

2.1 Summary

The assessment was undertaken in accordance and consideration of the following Acts and Policies:

- *Biodiversity Conservation Act 2016* (NSW) (BC Act).
- *Biodiversity Conservation Regulation 2017* (NSW) (BC Regulation).
- *Biosecurity Act 2015* (NSW).
- *Coastal Management Act 2016*.
- *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act).
- State Environmental Planning Policy (Biodiversity and Conservation) 2021
 - Chapter 4: Koala Habitat Protection 2021
- *Water Management Act 2000* (NSW) (WM Act).
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Maitland Local Environmental Plan 2011
- Maitland Development Control Plan 2011

Information pertaining to the above list is presented in the following subsections.

2.2 Biodiversity Conservation Act 2016 (NSW)

The NSW BC Act together with the NSW BC Regulation outlines the framework for addressing impacts on biodiversity from development and clearing. The framework details a pathway to avoid, minimise and offset impacts on biodiversity from development through the Biodiversity Offset Scheme (BOS).

Entry into the NSW Biodiversity Offset Scheme (BOS) is triggered by developments, projects and activities that meet criteria or certain thresholds for significant impacts on biodiversity in accordance with Section 6.3 of the BC Act.

Criteria to which the BOS applies include the following:

- Local Development (assessed under Part 4 of the *Environmental Planning and Assessment Act 1979*) that triggers the BOS Threshold or is “likely to significantly affect threatened species” (based on a test of significance pursuant to Section 7.3 of the BC Act). The BOS Threshold has two parts, and is triggered by the following:
 - Clearing of vegetation that exceeds an area threshold (based on the minimum lot size),
or

- Impacts are predicted to occur within an area mapped on the NSW Biodiversity Values Map (BV Map) (DPE 2022f).
- State Significant Development (SSD) and State Significant Infrastructure projects (SSI), unless “the Secretary of the Department of Planning, Industry and Environment and the environment agency head determine that the project is not likely to have a significant impact”.
- Biodiversity certification proposals.
- Clearing of native vegetation in urban areas and areas zoned for environmental conservation that exceeds the BOS threshold and does not require development consent.
- Clearing of native vegetation that requires approval by the Native Vegetation Panel under the *Local Land Services Act 2013*.
- Activities assessed and determined under Part 5 of the EP&A Act (generally, proposals by government entities) if proponents choose to ‘opt in’ to the Scheme.

Conclusion

No areas of the Subject Site are mapped on the BV Map. The minimum lot size of the Subject Site is 450m²; therefore, the vegetation clearing threshold that would trigger entry into the BOS is 0.25 hectares (ha). The grasslands within the Subject Site are exotic and no clearing of native vegetation will be required for the project. Entry into the BOS is not triggered. A FFAR is appropriate to support the DA.

2.2.1 Biosecurity Act 2015

Under the *Biosecurity Act 2015* (NSW) all plants are regulated with a 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.” Under the Act, a biosecurity impact “is an adverse effect on the economy, environment, or the community that arises, or has the potential to arise, from a biosecurity matter.” This legislation is addressed in **Section 5.2.5**.

2.2.2 Water Management Act 2000

Controlled activities carried out in, on or under waterfront land are regulated by the *Water Management Act 2000* (“WM Act”). ‘Waterfront land’ is defined as the bed of any river, lake or estuary, and the land within 40 m of the riverbanks, lake shore or estuary mean high water mark.

Lochinvar Creek flows through the eastern portion of the Study Area; however, the development has been designed to avoid impacts to the Vegetated Riparian Zone (VRZ) of this stream. As such, the proposed development does not constitute a ‘controlled activity’ in accordance with the WM Act.

Consideration of indirect impacts to aquatic and riparian habitat is provided in **Section 5**. Mitigation measures are detailed in **Section 5.2**.

2.2.3 State Environmental Planning Policy (Biodiversity and Conservation) 2021

Chapter 4 - Koala Habitat Protection (2021)

Chapter 4 of the SEPP contains provisions aimed to encourage the conservation and management of areas of natural vegetation that provide habitat for Koalas to support a permanent free-living population over their present range and reverse the current trend of Koala population decline.

The Subject Site does not contain 'Highly Suitable Habitat' as defined by the Koala SEPP 2021 (Koala feed trees listed in Schedule 2 do not comprise greater than 15% of overstorey species). As such, the site does not support Core Koala Habitat, thus a Koala Assessment Report is not required.

2.2.4 State Environmental Planning Policy (Resilience and Hazards) 2021

The State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP) consolidates, transfers and repeals the provisions of three (3) SEPPs into a single environmental planning instrument, including: the SEPP (Coastal Management) 2018 (Coastal Management SEPP), SEPP 33 – Hazardous and Offensive Development (SEPP 33), and SEPP 55 – Remediation of Land (SEPP 55). The Resilience and Hazards SEPP aims to promote the protection and improvement of key environmental assets for their intrinsic value and the social and economic benefits they provide. Relevant chapters of the Resilience and Hazards SEPP are considered below:

Chapter 2 – Coastal Management

The aim of this Chapter is to promote an integrated and coordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the Coastal Management Act 2016, including the management objectives for each coastal management area, by:

- Managing development in the coastal zone and protecting the environmental assets of the coast.
- Establishing a framework for land use planning to guide decision-making in the coastal zone.
- Mapping the 4 coastal management areas that comprise the NSW coastal zone for the purpose of the definitions in the Coastal Management Act 2016.

The Coastal Management Chapter incorporates the provisions of the now repealed Coastal Management SEPP which commenced on 3 April 2018 and consolidated the provisions of: SEPP 14 (Coastal Wetlands), SEPP 26 (Littoral Rainforests) and SEPP 71 (Coastal Protection).

The Coastal Management Chapter defines the four coastal management areas in accordance with the Coastal Management Act and details mapping and specifies assessment criteria that are tailored

for each coastal management area. Councils and other consent authorities must apply these criteria when assessing proposals for development that fall within one or more of the mapped areas.

The four coastal management areas are:

- Coastal wetlands and littoral rainforests area – areas which display the characteristics of coastal wetlands or littoral rainforests that were previously protected by SEPP 14 and SEPP 26.
- Coastal vulnerability area – areas subject to coastal hazards such as coastal erosion and tidal inundation.
- Coastal environment area – areas that are characterised by natural coastal features such as beaches, rock platforms, coastal lakes and lagoons and undeveloped headlands. Marine and estuarine waters are also included.
- Coastal use area – land adjacent to coastal waters, estuaries and coastal lakes and lagoons.

The Study Area does not contain areas mapped as any of the four coastal management areas above. As such, the *Coastal Management Act 2016* does not apply to this development.

2.2.5 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

Under the EPBC Act, an approval is required for actions that are likely to have a significant impact on Matters of National Environmental Significance (MNES). An action includes a project, development, undertaking, activity or series of activities. When a person proposes to take an action, which they believe may need approval under the EPBC Act, they must refer the proposal to the Australian Government Minister for the Environment. The Act identifies the following nine MNES:

- World Heritage properties
- National heritage places
- Wetlands of international importance (Ramsar Convention)
- Listed threatened species and communities
- Migratory species listed under international agreements
- Great Barrier Reef Marine Park
- Commonwealth marine areas
- Nuclear actions
- Water resources in respect to CSG and large coal mines

The proponent is required to address the EPBC Act as part of their development application to Council. Listed threatened species and communities are relevant to the proposed development. A summary of this assessment is presented in **Section 4.7**.

2.2.6 Maitland Local Environmental Plan 2011

The Study Area is located within the City of Maitland LGA. The Maitland Environmental Plan 2013 (LEP) controls development within the Study Area through zoning and development controls. These controls are described in greater detail by the supporting Maitland Development Control Plan 2011 (DCP).

2.2.7 Maitland Development Control Plan 2011

The Maitland Development Control Plan 2011 supports the LEP by providing additional detail and guidance on addressing biodiversity issues associated with development. In regard to biodiversity, the DCP contains provisions that relate to environmental effects, soil and erosion control and vegetation. These provisions have been considered during the preparation of this assessment.

3 Materials and Methods

3.1 Desktop Assessment

Existing information on flora and fauna within the Study Area and the locality, including relevant threatened biota, was obtained from:

- Lower Hunter and Central Coast Regional vegetation survey 2018 (VIS ID 2227)
- The BioNet Atlas of NSW Wildlife (DPE, 2022a) for previous records of threatened species, populations and ecological communities (as listed under the BC Act) within a 5 km radius of the Study Area.
- The Department of the Environment and Energy (DAWE 2022a) Protected Matters Search Tool, which involved a search for matters of national environmental significance within a 5 km radius of the Study Area.
- Relevant published literature on threatened biota (see References).

The results of the database searches were used to compile a list of threatened species, populations and communities, as listed under the BC Act and EPBC Act that could potentially occur within the Subject Site and their likelihood of occurrence (**Appendix A**).

3.2 Field Survey

3.2.1 Data Review

Regional vegetation mapping projects for the area were reviewed to assist with the determination of Plant Community Types (PCTs) within the Study Area. Review of the *Lower Hunter and Central Coast Regional vegetation survey 2018 (VIS_ID 2227)* indicates that three main vegetation types are mapped near the Study Area:

- *Seaham Spotted Gum Iron Bark Forest (Mu 16)*
- *Central Hunter Riparian Forest (Mu 13)*
- *Hunter Lowland Redgum Forest (Mu 19)*

The vegetation assessment confirmed that none of the above listed PCTs occur within the Subject Site. The PCTs would have occurred historically prior to clearing of the site for agricultural development.

3.2.2 Vegetation Mapping Surveys

A vegetation survey was conducted throughout the Study Area on 26 April 2022. The boundaries of vegetation types were mapped using a combination of rapid data points (RDP) and walking transects,

using the polygons produced through aerial photo interpretation (API) to assist in targeting survey effort. RDPs involved collecting waypoints over the Study Area using a handheld GPS unit and recording dominant species, structure and condition. Walking transects involved verifying polygons where homogenous in floristic composition and condition, as well as walking vegetation ecotones and using the recorded tracks to define vegetation community boundaries. The RDPs and survey tracks were then overlaid on an aerial photograph and used to delineate and/or clarify vegetation boundaries.

3.2.3 Plant Community Type and Determination

Each vegetation community identified within the Study Area was assigned to the closest equivalent PCT from those listed in the BioNet Vegetation Classification Database (DPE 2022b). The closest equivalent PCT for each vegetation community was determined through a comparison of the floristic descriptions of PCTs in the database with the plot / transect data collected from the Subject Site. In addition to floristic and structural similarity, the landscape position, soil type and other diagnostic features of the vegetation communities on the site were compared to the descriptions in the database to determine the most suitable PCT. Threatened ecological communities (TECs) as defined in NSW and Commonwealth legislation were also identified if present.

3.2.4 Vegetation Sampling

Two vegetation survey plots (400m²) were sampled in accordance with Section 4.3 of the NSW Biodiversity Assessment Method or BAM (DPIE 2020a) (**Figure 4**). Although the BAM is not applicable to the project, this method is considered best practise to collect site condition data for the composition, structure and function attributes of vegetation, as listed in **Table 1**.

Table 1 Components of Vegetation Integrity

Growth form groups	Function attributes
<ul style="list-style-type: none"> • Tree (TG) • Shrub (SG) • Grass and grass-like (GG) • Forb (FG) • Fern (EG) • Other (OG) 	<ul style="list-style-type: none"> • Number of large trees • Tree regeneration (presence/absence) • Tree stem size class (presence/absence) • Total length of fallen logs • Litter cover • High threat exotic vegetation cover (HTE) • Hollow-bearing trees (HBT)

The locations of survey plots and assessment tracks are illustrated on **Figure 3**.

3.2.5 Floristic Identification and Nomenclature

Floristic identification and nomenclature were based on Harden (1992, 1993, 2000 and 2002) with subsequent revisions as published on PlantNet (<http://plantnet.rbgsyd.nsw.gov.au>).

3.2.6 Threatened Flora Surveys

To inform the assessment of suitable habitat for threatened species and populations within the Subject Site, a database search of the NSW DPE BioNet Atlas (DPE 2022a) was conducted. Results of the database search and 'likelihood of occurrence' assessment are provided in **Appendix A**.

3.2.7 Fauna Habitat Assessment

The locations of any important habitat features, such as microbat roosting habitat, hollow-bearing trees, terrestrial refugia and nests/burrows, were captured with a handheld GPS and photographed where appropriate. Searches for potential habitat for threatened fauna species included but were not limited to:

Foraging trees for threatened birds.

- Hollow-bearing trees
- Koala feed trees
- Potential roosts for microbats
- Vegetated ponds, riparian vegetation and drainage lines for frogs and waterbirds
- Woody debris, leaf litter and bush rock

Diurnal opportunistic and incidental observations of fauna species were recorded during field surveys. These included opportunistic observations of fauna activity such as scats, tracks, burrows or other traces. The search effort is illustrated on **Figure 3**

3.2.8 Survey Limitations

The survey techniques and survey effort applied for this study were commensurate with the nature and condition of the biodiversity values with the Subject Site. Priority was given to habitat assessment for relevant threatened biota. A 'likelihood of occurrence' assessment was applied to all species previously recorded or predicted to occur within the locality based on State and Commonwealth information sources.





A low diversity of native and exotic flora species was recorded. An extended survey duration or multiple seasonal surveys would likely result in the detection of a slightly greater diversity of species. Furthermore, on-site surveys did not incorporate fauna trapping techniques. Due to the limited extent of fauna habitat, utilising trap surveying techniques are unlikely to have yielded detection of a greater diversity of fauna species.



Figure 3 - Survey Effort



Legend

-  Study Area
-  Subject Site
-  Vegetation Survey Plot
-  Survey Track (26/04/22)

4 Results

4.1 Landscape Features

The landscape features that are applicable to the Study Area are described in **Table 2**.

Table 2 Landscape Features

Landscape Features	Information
IBRA Region	Sydney Basin
IBRA Sub Region	Hunter
Local Government Area (LGA)	City of Maitland Local Government Area
Mitchell Landscape	Newcastle Coastal Ramp (DECC, 2002; Mitchell 2002) - Undulating lowlands and low to steep hills on complex patterns of faulted and gently folded Carboniferous conglomerate, lithic sandstone, felspathic sandstone, and mudstone, general elevation 50 to 275m, local relief 40 to 150m. Stony red texture-contrast soils on steep slopes, yellow and brown texture-contrast soils on lower slopes and deep dark clay loams along streams. W.
Soils and Geology	Lochinvar Soil Landscape – This soil landscape covers undulating rises around the village of Lochinvar. The main soils are Non-calcic Brown Soils (Db1.12) on the gentle slopes with Brown Podzolic Soils (Db2.11, Db1.41) on the steeper areas. There are Yellow Solodic Soils (Dy2.12) on the mid to lower slopes of the steeper hills and in some drainage lines.
Rivers, streams and estuaries	Lochinvar Creek flows through the eastern portion of the Study Area; however, the development has been designed to avoid impacts to the Vegetated Riparian Zone (VRZ) of this stream.
Wetlands	No Coastal wetlands mapped on the Coastal Wetlands and Littoral Rainforests Area Map (DPE 2022) occur within the Study Area.
Connectivity of different areas of habitat	The vegetation within the Subject Site is comprised of grasslands, which have good connectivity with surrounding grasslands. No areas of bushland occur within the Subject Site. The riparian vegetation associated with Lochinvar Creek is comprised of a narrow strip, which extends north and south.
Areas of geological significance and soil hazard features	The Study Area is not located with an area identified as having any particular geological significance. No mapping was identified that would indicate the site contains any soil hazard features.
Areas of outstanding biodiversity value	There are no areas of “outstanding biodiversity value” (in accordance with Section 3.1.3 of the BAM (DPIE 2020a) mapped within the Subject Site or the Study Area.

4.2 Plant Community Type

The grasslands within the Subject Site are homogenous and dominated by exotic grass species throughout (see **Figure 4**). No trees or shrub species occur. The dominant ground cover species were *Paspalum dilatatum* (Paspalum), *Sporobolus parramattensis* (Parramatta Grass), *Axonopus fissifolius* (Narrow-leaved Carpet Grass), *Setaria parviflora* (Pigeon Grass), *Cyperus brevifolius* (Mullumbimby Couch), *Plantago lanceolata* (Lamb's Tongues), *Eragrostis cilianensis* (Stink Grass), and *Verbena bonariensis* (Purple Top).

The vegetation survey plot data indicates that less than 2% of the groundcover is comprised of native species. These included *Cynodon dactylon* (Couch), *Dichondra repens* (Kidney Weed), *Oxalis perrenans*, *Cymbopogon refractus* (Barbed-wire Grass), *Sporobolus creber* (Slender Rat's Tail Grass), *Bothriochloa macra* (Red Grass), and *Panicum effusum* (Hairy Panic).

A complete list of flora species detected within the Study Area is presented in **Appendix C**. A representative photograph of the native vegetation is presented in **Plate 1** and **Plate 2**.



Plate 1 Exotic Grassland within the central portion of the Subject Site

Date & Time: Tue, 26 Apr 2022, 16:29:50 AEST
Position: 56 S 354807 6381598 (+15.7M)
Altitude: 100ft (+10.8ft)
Datum: WGS-84
Azimuth/Bearing: 147° S88E 2619mils True (+12°)
Elevation Angle: -05.3°
Horizon Angle: -02.0°
Zoom: 1.0X
Windermere FFAR PP 03








Plate 2 Exotic Grassland within the eastern portion of the Subject Site



Figure 4 - Vegetation Mapping



Legend

-  Study Area
-  Subject Site
-  Boundary (R1 Zone & E3 Zone)
- Vegetation Type**
-  Exotic Grassland (Managed)
-  Swamp Oak Forest EEC

4.3 Weeds

Several exotic plant species were detected during the assessment. One Priority Weed species was detected in low abundance: *Senecio madagascariensis* (Fireweed). Recommendations for management of weeds is discussed in **Section 5.2.5**.

4.4 Habitat Features

The grasslands within the Subject Site lack trees and shrubs, which are likely to have been cleared during historical clearing within locality for agricultural development. Key habitat features such as hollows, habitat logs and stags are absent. No Preferred Koala feed trees (as listed under Schedule 2 of the Koala SEPP 2021) occur.

The habitat represents marginal foraging habitat for common terrestrial fauna species such as macropods. No breeding habitat such as hollow-bearing trees or aquatic habitat occurs

4.5 Threatened Species

4.5.1 Threatened Flora

No threatened flora species were detected during the assessment. A search of the BioNet Atlas of NSW Wildlife (DPE, 2022a) returned eleven (11) threatened flora species within a 5 km radius of the Study Area (**Appendix A**). An EPBC Protected Matters Search returned a list of ten (10) threatened plant species predicted to occur within 5 km of the Study Area (**Appendix B**).

A 'likelihood of occurrence' assessment determined that all threatened plant species have nil to low likelihood of occurrence within the Subject Site due to the lack of available habitat.

4.5.2 Threatened Fauna

No threatened fauna species were identified within the Study Area during the assessment. A search of the BioNet Atlas of NSW Wildlife (DPE, 2022a) returned a list of 25 threatened fauna species (comprised of 13 birds and 12 mammals) within a 5 km radius of the Study Area (**Appendix A**). An EPBC Protected Matters Search returned a list of twenty-one (21) fauna species predicted to occur within 5 km of the Study Area (**Appendix B**).

A 'likelihood of occurrence' assessment determined that the Study Area is unlikely to constitute suitable habitat for all threatened fauna species predicted within the locality. Due to the degraded nature of the site, only highly mobile fauna species are likely to utilise the habitat as part of a broader network of habitats.

4.6 Threatened Ecological Communities

The vegetation within the Subject Site does not represent any TECs listed under either the NSW BC Act or the Commonwealth EPBC Act. The riparian vegetation associated with Lochinvar Creek is dominated by *Casuarina glauca* (Swamp Oak) and is commensurate with two TECs:

- *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*, which is listed as an Endangered Ecological Community (EEC) under the BC Act.
- *Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community*, which is listed as an Endangered Ecological Community (EEC) under the EPBC Act.

4.7 EPBC Protected Matters

No EPBC listed species were identified within the Subject Site. The grasslands are unlikely to be important habitat for any resident populations of EPBC listed species.

The EEC known as *Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community* occurs adjacent to the Subject Site; however, no direct impacts to this vegetation are proposed.

Referral to the Commonwealth Minister for the Environment is not recommended.

5 Discussion

5.1 Impact Assessment

5.1.1 Impacts to Native Vegetation

The proposed development will not require clearing of native vegetation. Mitigation measures to minimise the potential for harm to the environment during the construction phase are presented in **Section 5.2**.

5.1.2 Impacts to Fauna

Direct impacts of the proposed development on fauna habitat include the following:

- The disturbance of soil and removal of understorey vegetation during construction potentially displacing ground-dwelling fauna such as amphibians and reptiles.
- Potential indirect impacts of the proposed development on resident fauna populations include the following:
 - Noise and lighting during the construction phase may cause minor disturbance to resident fauna within the locality and disrupt their natural behaviour
 - Pollution such as chemical spills from construction machinery may have adverse effects on biota in the adjacent mapped waterway and downstream aquatic environments.
 - Ground disturbance by machinery during the construction phase may create dust and facilitate the movement of sediment.

Management measures are presented in **Section 5.2** to reduce the potential for these impacts.

5.1.3 Impacts to Threatened Species

No threatened species were identified within the Study Area during the assessment. The grasslands are unsuitable habitat for most threatened species that are known to occur within the locality. No threatened species were considered to have a moderate or higher likelihood of occurrence; hence, Assessments of Significance (AoS), pursuant to Section 7.3 of the BC Act were not prepared

5.1.4 Impacts to Threatened Ecological Communities

The EEC known as *Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community* occurs adjacent to the Subject Site; however, no direct impacts to this vegetation are proposed. Potential indirect impacts to the EEC include the following:

- The excavation of soil within the Subject Site during the construction phase has the potential to facilitate erosion and sediment movement. Run-off from the Study Area has the potential to introduce nutrients and other contaminants to the riparian zone and downstream aquatic habitats.
- The introduction of chemicals such as fuels for vehicles and machinery during the construction phase has the potential to cause pollution to the riparian zone and downstream aquatic habitat.
- The potential spread of exotic plant species to the riparian zone from disturbed soil in the Subject Site.

Management measures are presented in **Section 5.2** to reduce the potential for indirect impacts to the EEC.

5.1.5 Cumulative Impacts

Cumulative impacts arise from the interaction of individual elements associated with the proposed development and the additive effects of other external projects. No other known projects within the locality are known to have relevance to this project that could exacerbate cumulative impacts.

5.2 Impact Amelioration

5.2.1 Vegetation Protection

Care should be taken to avoid indirect impacts on native vegetation within the riparian exclusion zone during the construction phase of the project. It is recommended that areas of native vegetation to be retained are demarcated with high visibility tape and identified as “no go” zones before and during the construction period.

5.2.2 Erosion Control

Mitigation measures to reduce soil erosion and pollutant run-off during construction activities should include:

- Installation of erosion and sediment control structures along the boundaries of the Study Area prior to any construction works and in accordance with *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004).
- Regular inspection of erosion and sediment control measures, particularly following rainfall events, to ensure their ongoing functionality.
- The prompt removal of any excavated material offsite.

- Undertake maintenance of silt fences and other mitigation measures to isolate run-off, particularly on the western boundary of the Study Area.

5.2.3 Dust Control

Specific measures to minimise the generation of dust and associated impacts on adjacent natural environments should include:

- Setting maximum speed limits for all traffic within the Study Area to limit dust generation.
- Use of a water tanker to spray unpaved access tracks during the construction phase where required.
- Application of dust suppressants or covers on soil stockpiles.

5.2.4 Chemical Spills

Specific measures to minimise the potential for chemical spills and associated impacts on adjacent natural environments should include the following:

- All chemicals must be kept in clearly marked bunded areas.
- Regularly inspect vehicles and mechanical plant for leakage of fuel or oil.
- No re-fuelling, washing or maintenance of vehicles and plant to be undertaken within 20 m of natural drainage lines.

5.2.5 Management of Weeds

Several exotic plant species was recorded within the Study Area. Weed management should be implemented during and after construction to minimise weed incursions into surrounding intact native vegetation. This should include:

- Prioritising the control of Weeds of National Significance such as *Senecio madagascariensis* (Fireweed).
- Carrying out weed removal within the Study Area prior to the construction phase of the development. This will reduce the capacity of exotic plant species to spread into the locality. Organic matter and soil removed during this process should be disposed of appropriately.
- All vehicles and machinery should be cleaned before entering and leaving the Study Area. This is to prevent the introduction of new exotic species, as well as the spread of existing species.
- A list of control methods for exotic species listed in NSW can be found on the NSW WeedWise website (DPI, 2021).

5.3 Conclusion

The proposed development will require clearing Exotic Grasslands. No clearing of native vegetation is required for the project. Entry into the NSW BOS is not triggered.

The habitat within the Subject Site is generally unsuitable for threatened species. The proposed development is unlikely to cause a significant impact to any threatened species, populations, or ecological communities listed under the NSW BC Act.

No EPBC listed species, ecological communities, migratory species or important habitat for such entities were identified within the Subject Site. An EPBC referral to the Commonwealth Minister for the Environment is not recommended.

Avoidance and mitigation measures have been presented to reduce potential impacts to biodiversity values within the Study Area and the environment.

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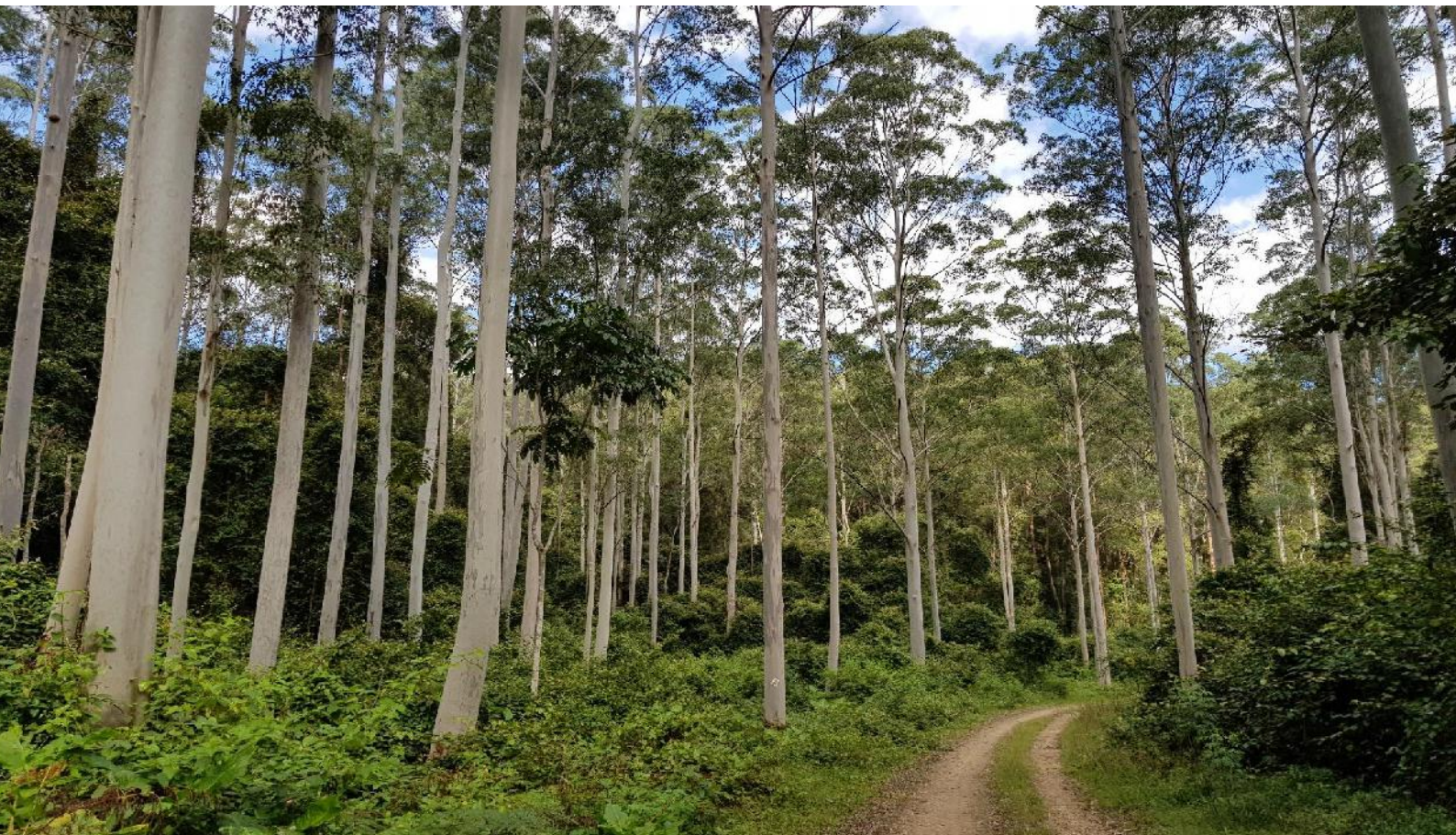
Appendix A – Threatened Species Database Search

A list of threatened species, populations and ecological communities that have been reported or modelled to occur from within a five-kilometre radius of the Study Area was obtained from the DPIE BioNet Atlas: (<http://www.bionet.nsw.gov.au/>).

The table below summarises the likelihood of threatened species occurring within the Subject Site based on the habitat requirements of each species.

Definition of the likelihood of occurrence criteria are as follows:

- Known – species identified within the site during surveys;
- High – species known from the area (DPIE BioNet Atlas records), suitable habitat (such as roosting and foraging habitat) present within the site;
- Moderate – species may be known from the area, potential habitat is present within the site;
- Low – species not known from the area and/or marginal habitat is present within the site; and
- Nil – habitat requirements not met for this species within the site



Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
<i>Acacia bynoeana</i> Bynoe's Wattle	E1	V	1	The species is endemic to central eastern NSW, currently known from only 30 locations, many of only 1-5 plants. Grows mainly in heath/ dry sclerophyll forest on sandy soils, prefers open, sometimes slightly disturbed sites such as trail margins, road edges, and in recently burnt open patches.	Low	No suitable habitat within the Subject Site. Few records within the locality. Not recorded during site assessment.
<i>Callistemon linearifolius</i> Netted Bottle Brush	V,3	-	1	This shrub grows up to 3-4 m tall, with red flowers that are clustered into the typical "bottlebrushes". The species grows in dry sclerophyll forest on the coast and adjacent ranges.	Low	No suitable habitat within the Subject Site. Records within the locality. Not recorded during site assessment.
<i>Cymbidium canaliculatum</i> population in the Hunter Catchment	E2, P2		1	This large epiphytic orchid has a scattered distribution across northern and eastern Australia, extending from Hunter River in NSW to Cape York and across northern NT and Queensland to the Kimberley region in WA. In NSW the species is restricted to the north-eastern quarter of the State, occurring chiefly in inland districts west to New Angledool and Walgett on the north western plains and north of the Hunter River, through the north western slopes, northern tablelands and north coast into south-eastern Queensland. A disjunct population of fewer than 500 individuals though estimated to be as low as 90, which occurs in the Hunter Valley at the south-eastern distributional limit of the species' range.	Nil	No suitable habitat within the Subject Site. Few records within the locality. Not recorded during site assessment.
<i>Eucalyptus glaucina</i>	V	V	10	Found only on the north coast of NSW and in separate districts: near Casino where it can be locally common, and farther south, from Taree to Broke, west of Maitland. Grows	Nil	No suitable habitat within the Subject Site. Few records within the locality.

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
Slatey Red Gum				in grassy woodland and dry eucalypt forest, mainly on deep, moderately fertile and well-watered soils.		Not recorded during site assessment.
<i>Eucalyptus camaldulensis</i> population in the Hunter catchment	E2		1	<p>The Hunter population occurs from the west at Bylong, south of Merriwa, to the east at Hinton, on the bank of the Hunter River, in the Port Stephens local government area. It has been recorded in the local government areas of Lithgow, Maitland, Mid-Western Regional, Muswellbrook, Port Stephens, Singleton and Upper Hunter.</p> <p>Prior to European settlement, between 10,000 and 20,000 ha of habitat suitable for the River Red Gum occurred in the Hunter catchment. Today only 19 stands are known, occupying at most c. 100 ha, the largest remnant being 15 - 20 ha in extent. Smaller remnants contain only one to several trees. The total number of individuals is estimated to be between 600 - 1000 mature or semi mature trees.</p>	Nil	<p>No suitable habitat within the Subject Site. Few records within the locality.</p> <p>Not recorded during site assessment.</p>
<i>Eucalyptus parramattensis</i> subsp. <i>decadens</i>	V	V	1	Generally occupies deep, low-nutrient sands, often those subject to periodic inundation or where water tables are relatively high. It occurs in dry sclerophyll woodland with dry heath understorey. It also occurs as an emergent in dry or wet heathland. Often where this species occurs, it is a community dominant.	Nil	<p>No suitable habitat within the Subject Site. Few records within the locality.</p> <p>Not recorded during site assessment.</p>
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	V	V	1	The species distribution is between Moss Vale/Bargo and the lower Hunter Valley, with most occurrences in Appin, Wedderburn, Picton and Bargo. The habitat for the species is broad including heath, shrubby woodland and open forest	Low	Habitat is considered to be too degraded.

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
Small-flower Grevillea				on light clay or sandy soils, and often in disturbed areas such as on the fringes of tracks.		Not recorded during site assessment.
<i>Persoonia pauciflora</i>				Extremely restricted distribution; all but one of the plants which make up the only known population occur within a 2.5 km radius of the original specimen at North Rothbury in the Cessnock local government area. Within this range, there are three main sub-populations which comprise approximately 90% of the total population. The other 10% of the population occurs as scattered individuals in what is a relatively disturbed landscape. It is found in dry open forest or woodland dominated by Spotted Gum (<i>Corymbia maculata</i>), Broad-leaved Ironbark (<i>Eucalyptus fibrosa</i>) and/or Narrow-leaved Ironbark (<i>E. crebra</i>) and supporting a moderate to sparse shrub layer and grassy groundcover.	Nil	No suitable habitat within the Subject Site. Few records within the locality.
North Rothbury Persoonia	CE	CE	1			Not recorded during site assessment.
<i>Pterostylis gibbosa</i>				This species of ground-dwelling orchid is known from a small number of populations in the Hunter region, the Illawarra region, and the Shoalhaven region in New South Wales. Habitat for this species includes open forest and woodland on flat or gently sloping land.	Nil	No suitable habitat within the Subject Site. Few records within the locality.
Illawarra Greenhood	E1,P,2	E	1			Not recorded during site assessment.
<i>Rutidosia heterogama</i>				Small perennial herb of the daisy family to 30cm. Grows in heath on sandy soils and moist areas in open forest, and has been recorded along disturbed roadsides. The species has a scattered distribution in coastal locations between Wyong and Evans Head and on the New England Tablelands from Torrington and Ashford south to Wandsworth south-west of Glen Innes.	Low	No suitable habitat within the Subject Site. Few records within the locality.
Heath Wrinklewort	V	V	1			Not recorded during site assessment.

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
<i>Syzygium paniculatum</i> Magenta Lilly Pilly	E1	V	1	The species occurs in a narrow coastal strip from Bulahdelah to Conjola State Forest. Rainforest on sandy soils or stabilised Quaternary sand dunes at low altitudes in coastal areas, often in remnant littoral or gallery rainforests. Plants produce white flower-clusters at the end of each branch is the preferred habitat for this species. The petals are small accompanied by prominent long stamens.	Nil	No suitable habitat within the Subject Site. Records within the locality. Not recorded during site assessment.
<i>Anthochaera phrygia</i> Regent Honeyeater	E4A,P	CE	3	In NSW the species is confined to two known breeding areas: the Capertee Valley and Bundarra-Barraba region. Non-breeding flocks are seen occasionally in coastal areas foraging in flowering Spotted Gum and Swamp Mahogany forests. Habitat for the species includes dry open forest and woodlands, particularly Box-Ironbark woodland and riparian forests of River Sheoak, with an abundance of mature trees, high canopy cover and abundance of mistletoes.	Low	No suitable habitat within the Subject Site. Few records within the locality. Not recorded during site assessment.
<i>Artamus cyanopterus cyanopterus</i> Dusky Woodswallow	V,P	-	1	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.	Low	No suitable habitat within the Subject Site. Not recorded during site assessment.
<i>Chthonicola sagittata</i> Speckled Warbler	V,P	-	6	Within NSW most frequently reported from the hills and tablelands of the Great Dividing Range, rarely from the coast. The species inhabits a wide range of Eucalypt-dominated communities with a grassy understorey, a sparse shrub layer, often on rocky ridges or in gullies. Sedentary and requires large, relatively undisturbed remnants to persist in an area. Forages on the ground for seeds and insects, and nests in a slight hollow in the ground or at the base of low dense plants.	Low	Marginally suitable aerial foraging habitat within the Subject Site. Few records within the locality. Not recorded during site assessment.

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
<i>Circus assimilis</i>	V,P	-	1	The Spotted Harrier occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges, and rarely in Tasmania. Individuals disperse widely in NSW and comprise a single population. Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	Low	Marginally suitable aerial foraging habitat within the Subject Site. Few records within the locality. Not recorded during site assessment.
Spotted Harrier						
<i>Climacteris picumnus victoriae</i>	V,P	-	1	Small grey-brown bird with black streaking on the lower breast/belly and black bars on the undertail. Inhabits Box-Gum woodlands and dry open forest of inland slopes and plains. Preferred woodlands dominant by stringybarks or other rough-barked eucalypts. Forages in trees and on the ground. Endemic to eastern Australia, occurring from the coast to inland plains and western slopes of the great dividing range. Nests in tree or stump hollows greater than 6cm.	Nil	No suitable habitat within the Subject Site. Few records within the locality. Not recorded during site assessment.
Brown Treecreeper (eastern subspecies)						
<i>Daphoenositta chrysoptera</i>	V,P	-	4	Sedentary, occurs across NSW from the coast to the far west. Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Sensitive to habitat isolation and loss of structural complexity, and adversely affected by dominance of Noisy Miners. Cleared agricultural land is potentially a barrier to movement. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.	Nil	No suitable habitat within the Subject Site. Few records within the locality. Not recorded during site assessment.
Varied Sittella						
<i>Ephippiorhynchus asiaticus</i>	E1,P	-	1	Primarily inhabits permanent freshwater wetlands and surrounding vegetation including swamps, floodplains, watercourses and billabongs, freshwater meadows, wet heathland, farm dams and shallow floodwaters. Will also	Nil	No suitable habitat within the Subject Site. Few records within the locality.

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
Black-necked Stork				forage in inter-tidal shorelines, mangrove margins and estuaries. Feeds in shallow, still water. This species breeds during summer, nesting in or near a freshwater swamp.		Not recorded during site assessment.
<i>Falco subniger</i>	V	-	1	The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. Some reports of 'Black Falcons' on the tablelands and coast of New South Wales are likely to be referable to the Brown Falcon. In New South Wales there is assumed to be a single population that is continuous with a broader continental population, given that falcons are highly mobile, commonly travelling hundreds of kilometres (Marchant & Higgins 1993). The Black Falcon occurs as solitary individuals, in pairs, or in family groups of parents and offspring.	Nil	No suitable habitat within the Subject Site. Few records within the locality.
Black Falcon						Not recorded during site assessment.
<i>Glossopsitta pusilla</i>	V,P	-	1	The species occurs from the coast to western slopes of the Great Dividing Range and inhabits dry, open eucalypt forests and woodlands. Occurrence is positively associated with patch size, and with components of habitat complexity including canopy cover, shrub cover, ground cover, logs, fallen branches and litter. Feed primarily on profusely-flowering eucalypts and a variety of other species including melaleucas and mistletoes. On the western slopes and tablelands <i>Eucalyptus albens</i> and <i>E. melliodora</i> are particularly important food sources for pollen and nectar respectively. Mostly nests in small (opening approx. 3cm) hollows in living, smooth-barked eucalypts, especially <i>Eucalyptus viminalis</i> , <i>E. blakelyi</i> and <i>E. dealbata</i> . Most breeding records are from the western slopes.	Low	No suitable habitat within the Subject Site. Few records within the locality.
Little Lorikeet						Not recorded during site assessment.
<i>Haliaeetus leucogaster</i>	V,P	-	1	The White-bellied Sea-Eagle is found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles,	Low	No suitable nesting habitat within the Subject Site. Few records within the locality.

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
White-bellied Sea-Eagle				mammals and carrion. Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass.		Not recorded during site assessment.
<i>Hieraaetus morphnoides</i>	V,P	-	1	Occurs throughout NSW except most densely forested parts of the Dividing Range escarpment. Occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring.	Nil	No suitable nesting habitat within the Subject Site. Few records within the locality. Not recorded during site assessment.
Little Eagle						
<i>Pomatostomus temporalis temporalis</i>	V,P	-	24	The Grey-crowned Babbler has two distinctive subspecies that intergrade to the south of the Gulf of Carpentaria. West of here the subspecies rubeculus, formerly considered a separate species (Red-breasted Babbler) is still widespread and common. The eastern subspecies (temporalis occurs from Cape York south through Queensland, NSW and Victoria and formerly to the south east of South Australia. Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions.	Low	No suitable nesting habitat within the Subject Site. Not recorded during site assessment.
Grey-crowned Babbler (eastern subspecies)						
<i>Tyto novaehollandiae</i>	V,P,3	-	2	Occurs across NSW except NW corner. Most common on the coast. Inhabits dry eucalypt woodlands from sea level to 1100 m. Roosts and breeds in large (>40cm) hollows and sometime caves in moist eucalypt forested gullies. Hunts along the edges of forests and roadsides. Home range between 500 ha and 1000 ha. Prey mostly terrestrial mammals but arboreal species may also be taken.	Low	No suitable nesting Habitat within the Subject Site. Few records within the locality. Not recorded during site assessment.
Masked Owl						
<i>Dasyurus maculatus</i>	V,P	E	4	Found in eastern NSW, eastern Victoria, south-east and north-eastern Queensland, and Tasmania the species has been recorded across a range of habitat types, including	Low	No suitable habitat within the Subject Site. Few records within the locality.

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
Spotted-tailed Quoll				rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline		Not recorded during site assessment.
<i>Falsistrellus tasmaniensis</i> Eastern False Pipistrelle	V,P	-	1	The species occurs on southeast coast and ranges. Prefers tall (>20m) and wet forest with dense understorey. Absent from small remnants, preferring continuous forest but can move through cleared landscapes and may forage in open areas. Roosts include hollow trunks of Eucalypts, underneath bark or in buildings. Forages in gaps and spaces within forest, with large foraging range (12km foraging movements recorded).	Low	Foraging habitat only. No breeding habitat. Not recorded during site assessment.
<i>Micronomus norfolkensis</i> Eastern Coastal Free-tailed Bat	V,P	-	4	The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW. Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures.	Low	Foraging habitat only. No breeding habitat. Not recorded during site assessment.
<i>Miniopterus orianae oceanensis</i> Large Bent-winged Bat	V,P	-	14	Eastern Bentwing-bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.	Low	Foraging habitat only. No breeding habitat. Not recorded during site assessment.
<i>Myotis macropus</i> Southern Myotis	V,P	-	3	The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface.	Low	Foraging habitat only. No breeding habitat. Not recorded during site assessment.

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
<i>Petaurus norfolcensis</i> Squirrel Glider	V,P		5	The species is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey.	Nil	No suitable habitat within the Subject Site. Few records within the locality. Not recorded during site assessment.
<i>Phascogale tapoatafa</i> Brush-tailed Phascogale	V,P		7	The Brush-tailed Phascogale has a patchy distribution around the coast of Australia. In NSW it is mainly found east of the Great Dividing Range although there are occasional records west of the divide. Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater..	Nil	No suitable habitat within the Subject Site. Few records within the locality. Not recorded during site assessment.
<i>Pteropus poliocephalus</i> Grey-headed Flying-fox	V,P	V	118	Generally this species is found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. Inhabit subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	Nil	No suitable foraging habitat within the Subject Site. No roosts present. Not recorded during site assessment.
<i>Saccolaimus flaviventris</i> Yellow-bellied Sheath-tail-bat	V,P	-	2	Migrates from tropics to SE Aus in summer. Forages across a range of habitats including those with and without trees, from wet and dry sclerophyll forest, open woodland, Acacia shrubland, mallee, grasslands and desert. Seasonal movements are unknown.	Low	Foraging habitat only. No breeding habitat. Not recorded during site assessment.
<i>Scoteanax rueppellii</i>	V,P	-	4	The species is found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast	Low	Foraging habitat only. No breeding habitat.

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
Greater Broad-nosed Bat				over much of its range. In NSW it is widespread on the New England Tablelands, however does not occur at altitudes above 500 m. Inhabits a variety of habitats from woodland to wet and dry sclerophyll forests and rainforest, also remnant paddock trees and timber-lined creeks.		Not recorded during site assessment.
<i>Vespadelus troughtoni</i>	V,P	-	1	Very little is known about the biology of this uncommon species. A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals. Occasionally found along cliff-lines in wet eucalypt forest and rainforest.	Low	Broadly suitable foraging habitat within the Subject Site. Few records within the locality. Not recorded during site assessment.
Eastern Cave Bat						

Appendix B – PMST Search Results





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: 28-Jun-2022

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	7
Listed Threatened Species:	31
Listed Migratory Species:	15

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

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 <http://www.environment.gov.au/heritage>

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	21
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

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

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands)

[[Resource Information](#)]

Ramsar Site Name

[Hunter estuary wetlands](#)

Proximity

20 - 30km upstream
from Ramsar site

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

[Central Hunter Valley eucalypt forest and woodland](#)

Threatened Category

Critically Endangered

Presence Text

Community may occur within area

[Coastal Swamp Oak \(Casuarina glauca\) Forest of New South Wales and South East Queensland ecological community](#)

Endangered

Community may occur within area

[Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland](#)

Endangered

Community likely to occur within area

[Hunter Valley Weeping Myall \(Acacia pendula\) Woodland](#)

Critically Endangered

Community may occur within area

[Lowland Rainforest of Subtropical Australia](#)

Critically Endangered

Community may occur within area

[River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria](#)

Critically Endangered

Community likely to occur within area

[White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland](#)

Critically Endangered

Community may occur within 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

BIRD

Threatened Category

Presence Text

Scientific Name	Threatened Category	Presence Text
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat may occur within area
Erythrorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
MAMMAL		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within 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
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
PLANT		
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Eucalyptus glaucina Slaty Red Gum [5670]	Vulnerable	Species or species habitat known to occur within area
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat may occur within area
Persoonia pauciflora North Rothbury Persoonia [67214]	Critically Endangered	Species or species habitat may occur within area
Prasophyllum sp. Wybong (C.Phelps ORG 5269) a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat known to occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat may occur within area
Rutidosis heterogama Heath Wrinklewort [13132]	Vulnerable	Species or species habitat may occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat may occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area

REPTILE

Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat may occur within area
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Listed Migratory Species

[[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		

Scientific Name	Threatened Category	Presence Text
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat may occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat may occur within area overfly marine area

Extra Information

Regional Forest Agreements [\[Resource Information \]](#)

Note that all areas with completed RFAs have been included.

RFA Name	State
North East NSW RFA	New South Wales

EPBC Act Referrals [\[Resource Information \]](#)

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Hunter Natural Gas Pipeline	2004/1902	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed

Bioregional Assessments

SubRegion	BioRegion	Website
Hunter	Northern Sydney Basin	BA website

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
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- [-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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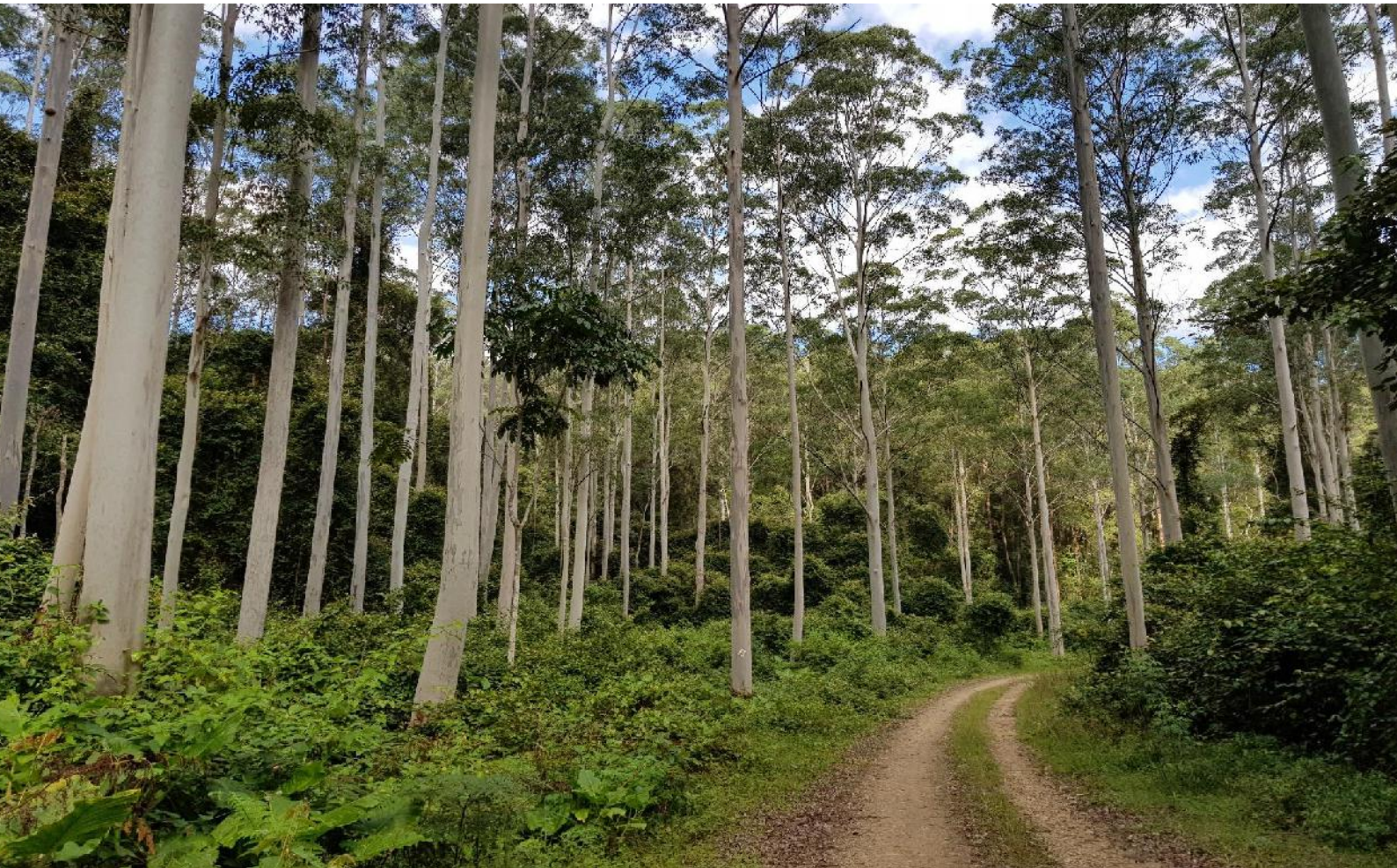
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Appendix C – Flora and Fauna Species Lists



Exotic/ Native	Species	Plot 1 (%)	Plot 2 (%)
Exotic	<i>Paspalum dilatatum</i> (Paspalum)	20	25
Exotic	<i>Sporobolus parramattensis</i> (Parramatta Grass)	20	20
Exotic	<i>Axonopus fissifolius</i> (Narrow-leaved Carpet Grass)	20	10
Exotic	<i>Setaria parviflora</i> (Pigeon Grass)	10	15
Exotic	<i>Cyperus brevifolius</i> (Mullumbimby Couch)	5	5
Exotic	<i>Plantago lanceolata</i> (Lamb's Tongues)	5	5
Exotic	<i>Eragrostis cilianensis</i> (Stink Grass)	5	1
Exotic	<i>Verbena bonariensis</i> (Purple Top)	1	1
Native	<i>Cynodon dactylon</i> (Couch)	0.5	1
Exotic	<i>Gamochaeta americana</i> (Cudweed)	0.5	0.5
Exotic	<i>Hypochaeris radicata</i> (Cat's ear)	0.5	0.5
Exotic	<i>Taraxicum officinale</i> (Dandelion)	0.5	0.5
Exotic	<i>Senecio madagascariensis</i> (Fireweed)	0.2	0.2
Exotic	<i>Briza minor</i> (Shivery Grass)	0.2	0.2
Native	<i>Dichondra repens</i> (Kidney Weed)	0.1	0.1
Native	<i>Oxalis perrenans</i>	0.1	0.1
Exotic	<i>Sonchus oleraceus</i> (Common Sow-thistle)	0.1	0.1
Native	<i>Cymbopogon refractus</i> (Barbed-wire Grass)	0.1	0
Native	<i>Sporobolus creber</i>	0.1	0.1
Native	<i>Bothriochloa macra</i> (Red Grass)	0.1	0
Native	<i>Panicum effusum</i> (Hairy Panic)	0	0.1
Total Cover		89	85.4



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