

BLACKWOOD ECOLOGICAL SERVICES



Ecological Assessment Proposed rezoning

Lot 100 DP 1201719
Hills Road, Rileys Hill

A Report to Alan Cardy
October 2020



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A handwritten signature in black ink, appearing to be 'Mark Free', is written over a horizontal line.

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1 INTRODUCTION

1.1 Background

Blackwood Ecological Services have been engaged by Alan Cardy to complete an Ecological Assessment for a proposed rezoning of land at Hills Road, Rileys Hill. The land is proposed to be rezoned to allow for residential subdivision. The Ecological assessment is to include land within Lot 100 DP 1201719.

The assessment is to involve initial field survey and provision of a report advising of key ecological issues. This assessment includes vegetation mapping and consideration of relevant database results and relevant ecological mapping.

1.2 The Subject site

The Subject site refers to the area proposed for rezoning. The Subject site for this study consists of land within Lot 100 DP 1201719. The Subject site is approximately 8.27 hectares. **FIGURE 1** shows the location of the Subject site.

The Subject site is located to the immediate south of the existing residential area of Rileys Hill. The site is accessed via Hills Road which forms the eastern boundary of the site. The western section of Broadwater National Park is located on the other side of Hills Road. Broadwater National Park is an area of 4290 hectares of wet and dry heathland, eucalypt forest, swampland and woodland. The park extends from near the village of Evans Head in the south, northwards towards the village of Broadwater and includes 9 kilometres of coastline.

The site is currently used for grazing and consists predominantly of grassland with forested vegetation in lower lying areas along the eastern boundary.

1.3 The Study area

The Study area refers to the Subject site together with any additional areas which are likely to be affected by the proposal, either directly or indirectly. The Study area in this case includes adjoining areas of land and vegetation including the western extent of Broadwater National Park.

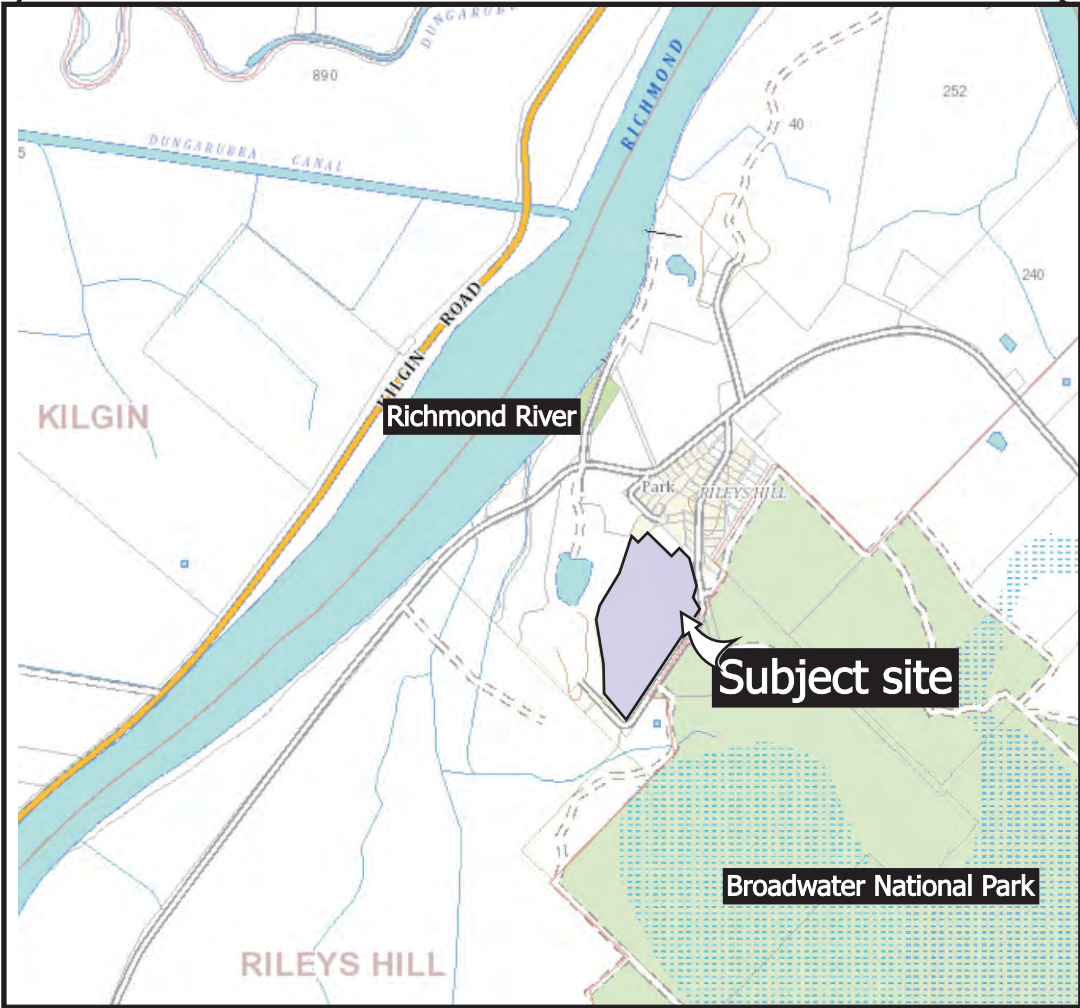
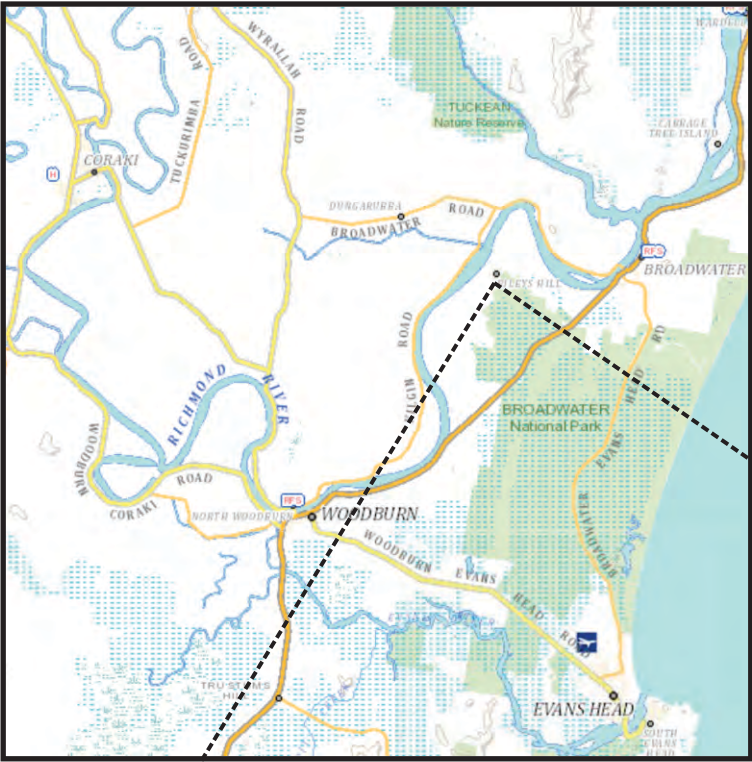
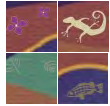
Outside of the forested areas of Broadwater National Park to the east, the Study area is characterised by sparsely vegetated grazing and agricultural land with patchy native vegetation. The Richmond River is located approximately 300-500m to the west of the site.

1.4 Proposed development

The Department of Planning issued a conditional Gateway Determination (dated 16th February 2018) in respect of the subject land as follows:

“Planning Proposal (Department Ref: PP_2018_RICHM_001_00): to rezone part of Lot 100 DP 1201719 at Hills Road, Rileys Hill from RU1 Primary Production to RU5 Village and change the minimum lot size from 40 hectares to 600m² to enable the land to be developed for low density residential purposes.”

An Ecological assessment was prepared to address Condition 1a (dated 17th July 2018), viz:



1. Prior to community consultation the following site investigations are to be undertaken and the planning proposal amended if necessary to reflect the outcomes of the site investigations. The site investigations are to be included in the material used for community consultation:
 - a. an ecological assessment;
 - b. a preliminary site contamination assessment including soil sampling as appropriate and to the satisfaction of Council;
 - c. an Aboriginal cultural heritage assessment;
 - d. an assessment of the potential impacts of the Rileys Hill Quarry operations, including a land use conflict risk assessment for potential blasting, noise, traffic and vibration impacts, should the operation of the quarry be resumed;
 - e. a traffic impact assessment;
 - f. a flood study;
 - g. a bushfire hazard risk assessment;
 - h. an infrastructure servicing plan; and
 - i. an acid sulfate soils assessment.
2. Prior to community consultation the planning proposal is to be amended as follows:
 - a. the content of the planning proposal is to be amended in accordance with the results of the site investigations require by Condition 1 of this Gateway determination;
 - b. maps which show the current and proposed zone and minimum lot size for the land are to be included within the planning proposal; and
 - c. a project time line is to be included in the planning proposal;
3. Once the site investigations required by Condition 1 have been undertaken and the planning proposal has been amended in accordance with Condition 2 the planning proposal is to be forwarded to the Department for approval of the form

Richmond Valley PP_2018_RICHM_001_00 (EF18/275)

of the proposal for community consultation in accordance with section 57(2) of the Act.

As per Condition 2 above, and as a consequence of on-going detailed communications with Council in complying with Condition 1 above, the Planning Proposal has been modified such that there has been:

- a significant reduction in the proposed footprint/area of the RU5 zone
- an increase in the mapped minimum lot size to 800m² for the RU5 zoned land
- the inclusion of an E2 – Environmental Conservation Zone over part of the land with a 2ha minimum lot size

As a consequence of the above, there has been a significant reduction in the potential lot yield as originally proposed, from 70 residential lots down to 35 residential lots (which will be zoned RU5) and one single dwelling opportunity lot (which will be zoned part RU1 and part E2).

This amended ecological assessment has been prepared to support/inform the community consultation process for the Planning Proposal as per Condition 3 above.

2 FLORA

2.1 Introduction

This section discusses the methods used in the vegetation assessment and presents the results of the assessment. Relevant databases and reports were reviewed to identify records of locally occurring Threatened and Rare plant species, populations and communities.

2.2 Database searches

2.2.1 NPWS Database search

A search of the NPWS Database revealed records of 12 Threatened flora species within 5km of the Subject site. These species are shown in **TABLE 1**.

TABLE 1
NPWS DATABASE RECORDS OF THREATENED FLORA
SPECIES WITHIN 5 KM OF THE SUBJECT SITE

Botanical name	Common name	NSW Status
<i>Rhodammia rubescens</i>	Scrub turpentine	E4A
<i>Rodomyrtus psidiooides</i>	Native guava	E4A
<i>Gossia fragrantissima</i>	Sweet Myrtle	E1
<i>Ochrosia moorei</i>	Southern Ochrosia	E1
<i>Belvisia mucronata</i>	Needle-leaf Fern	E1
<i>Diuris</i> sp. aff. <i>chrysantha</i>	Byron Bay Diuris	E1
<i>Phaius australis</i>	Southern Swamp Orchid	E1
<i>Desmodium acanthocladum</i>	Thorny Pea	V
<i>Archidendron hendersonii</i>	White Lace Flower	V
<i>Cryptocarya foetida</i>	Stinking Cryptocarya	V
<i>Endiandra hayesii</i>	Rusty Rose Walnut	V
<i>Syzygium hodgkinsoniae</i>	Red Lilly Pilly	V
<i>Macadamia tetraphylla</i>	Rough-shelled Bush Nut	V
<i>Oberonia titania</i>	Red-flowered King of the Fairies	V

KEY

E1	Endangered
E4A	Critically endangered
V	Vulnerable

2.2.2 Commonwealth EPBC Act (1999) Database search

A search of the Commonwealth EPBC Act (1999) Database revealed potential suitable habitat for a number of Threatened flora species within 5km of the Subject site. These species are shown in **TABLE 2**.

The Commonwealth EPBC Act Protected Matters Report is included in full in **APPENDIX A**.

TABLE 2
COMMONWEALTH EPBC ACT (1999) DATABASE OF THREATENED FLORA
SPECIES WITH POTENTIAL SUITABLE HABITAT
WITHIN 5 KM OF THE SUBJECT SITE

Botanical name	Common Name	Status
<i>Acronychia littoralis</i>	Scented acronychia	E
<i>Allocasuarina defungens</i>	Dwarf heath casuarina	E
<i>Arthraxon hispidus</i>	Hairy jointgrass	V
<i>Baloghia marmorata</i>	Marbled baloghia	V
<i>Cryptocarya foetida</i>	Stinking cryptocarya	V
<i>Cryptostylis hunteriana</i>	Leafless tongue-orchid	V
<i>Cynanchum elegans</i>	White-flowered wax plant	E
<i>Desmodium acanthocladum</i>	Thorny pea	V
<i>Diploglottis campbellii</i>	Small-leaved tamarind	E
<i>Endiandra floydii</i>	Floyd's walnut	E
<i>Endiandra hayesii</i>	Rusty rose walnut	V
<i>Floydia prealta</i>	Ball nut	V
<i>Gossia fragrantissima</i>	Sweet myrtle	E
<i>Macadamia integrifolia</i>	Macadamia nut	V
<i>Macadamia tetraphylla</i>	Rough-shelled bush nut	V
<i>Marsdenia longiloba</i>	Clear milkvine	V
<i>Ochrosia moorei</i>	Southern ochrosia	E
<i>Owenia cepiodora</i>	Onionwood	V
<i>Persicaria elatior</i>	Tall knotweed	V
<i>Phaius australis</i>	Lesser swamp orchid	E
<i>Rutidosia heterogama</i>	Heath wrinklewort	V
<i>Syzygium hodgkinsoniae</i>	Red lilly pilly	V
<i>Thesium australe</i>	Austral toadflax	V

KEY

E Endangered

V Vulnerable

2.3 Site assessment

2.3.1 Introduction

This section discusses flora species and vegetation on the Subject site and the ecological significance of this vegetation. Site surveys were undertaken on the 2nd of May 2018.

The objectives of the site assessment were:

- To identify vegetation communities and flora species present in the area subject to the proposed development.
- To complete initial targeted searches for significant flora species known from the locality and considered possible occurrences based on an assessment of site habitats. This includes targeted searches for Hairy joint grass.
- To assess key constraints and opportunities for development of the site based on the ecological assessment.

2.3.2 Site vegetation

Description

The site is currently used for grazing and consists predominantly of grassland with forested vegetation in lower lying areas along the eastern boundary. **FIGURE 2** shows vegetation mapping for the Subject site. Boundaries of Community 2 (Swamp sclerophyll woodland) were identified during the site survey using hand-held GPS (Garmin MAP78). A list of plant species recorded on the site is included in **APPENDIX B**.

Forested vegetation in the eastern part of the site is generally a continuum of forest within the western edge of Broadwater National Park which is located on the other side of Hills Road. The canopy is dominated by Blackbutt with a diversity of other eucalypts including Scribbly gum, Pink bloodwood, Red mahogany and Thin-leaved stringybark. Swamp turpentine and Brushbox are present and the midstorey includes patches of Coastal cypress pine, Hard quandong, Duboisia, Brush ironbark wattle, Cheese tree, Satinash, Leptospermums, Cabbage palm and other species.



PLATE 1 EUCALYPT/COASTAL CYPRESS PINE FOREST IN THE EASTERN PART OF THE SITE

The groundcover layer includes a diversity of native species including Spiny-headed mat rush, Bat's wing fern, Harsh ground fern, Blue flax lily, *Baloskion teraphyllum* and various native grasses. Weeds are generally sparse with species present including Smooth senna and a patch of Popcorn senna and Fruit salad plant in an old clearing.



VEGETATION COMMUNITIES

- 1. Tall Closed Sclerophyll forest (Blackbutt with mixed species)
- 2. Mid-high Open Swamp sclerophyll woodland (Broad-leaved paperbark)
- 3. Mid-high grassland (Mixed native and exotic species)
- Clump of Mixed eucalypts and dry rainforest species
- Clump of Brush ironbark wattle

SIGNIFICANT FAUNA & FAUNA HABITAT FEATURES

- Koala scat location
- Wallum froglet call location
- Hollow-bearing tree



0 Scale (metres) 100



PLATE 2 BROAD-LEAVED PAPERBARK FOREST WITH A GAHNIA UNDERSTOREY

The area of Blackbutt closed forest is fringed by an area of Broad-leaved paperbark forest of mixed age, with larger trees present closer to the Blackbutt forest and more recent regrowth further to the edges. Pink Euodia, Cabbage palm and Umbrella cheese tree are also present and the groundcover is dominated by Red-fruited saw-sedge. Swamp mahogany is present in this community but is not common. The edges of this community feature sparse growth of Broad-leaved paperbark with Red-fruited saw-sedge and scattered Slash pine amongst a grassy groundcover of native and exotic species.



PLATE 3 SCATTERED GAHNIA, SLASH PINE AND BROAD-LEAVED PAPERBARK IN THE CENTRAL PART OF THE SITE

The majority of the site consists of mixed grazed pasture grassland with patches of Blady grass and occasional weeds including Fireweed and, in wetter areas, Cuphea. On the upper slopes there are scattered small rainforest trees including Cudgerie, Hard quandong, Foambark, Tuckeroo and Blackwood wattle and occasional small clumps of these trees together with Pink bloodwood, Brush ironbark wattle, Willow bottlebrush, Native holly and Banana bush.



PLATE 4 GRAZED GRASSLAND WITH SCATTERED TREES IN THE WESTERN PART OF THE SITE

2.3.3 Conservation status of plant communities

Areas of mixed Blackbutt forest do not meet the definition of any listed Threatened ecological community under the NSW Biodiversity Conservation Act 2016 or Commonwealth EPBC Act 1999. This community type does contain patches of Coastal cypress pine forest that are protected as the TEC *Coastal cypress pine forest in the NSW North Coast Bioregion*. Areas of Broad-leaved paperbark forest on the site meet the definition of the Threatened Ecological Community *Swamp sclerophyll forest on floodplains*.

These areas are considered to have a high conservation value. Areas of pasture grassland with scattered trees do meet the definition of any TECs and have limited conservation value.

2.3.4 Significant species/communities recorded

No Threatened (BC Act 2016, EPBC Act 1999) flora species were recorded within the Subject site or adjacent land during the survey. The survey was completed at a time of year suitable for the detection of Hairy joint grass and wet grassland areas may provide potentially suitable habitat for this species. Hairy joint grass was not recorded on the site despite targeted searches in wetter grassland patches and throughout the site. The NPWS Atlas database search did not show any records of this species within 5km of the Subject site and it is not known to occur in the Study area.

2.3.5 Priority Weeds

Consistent with new Commonwealth biosecurity measures, NSW has reformed its weed, pest and disease legislation. The NSW Biosecurity Strategy 2013-2021 and NSW Biosecurity Act (2015) provide a framework for safeguarding primary industries, natural environments and communities from a range of pests, diseases and weeds. The NSW Biosecurity Act (2015) repeals the Noxious Weeds Act (1993).

The North Coast Regional Strategic Weed Management Plan has been developed in response to these reforms and lists priority weeds for the North Coast area. The status and distribution of any of these weeds present at the site are summarised in **TABLE 3**.

TABLE 3
STATE PRIORITY WEED OBJECTIVE AND DISTRIBUTION OF PRIORITY WEEDS RECORDED WITHIN THE SUBJECT SITE

Species	State Objective	Priority	Weed	Distribution
Camphor laurel	Additional concern	species	of	Occasional occurrence across the site.
Lantana	Asset protection			Occasional occurrence in vegetated patches.
Fireweed	Asset protection			Sparsely distributed throughout grassland areas.

Asset protection - These weeds are widely distributed in some areas of the State. As Weeds of National Significance, their spread should be minimised to protect priority assets.

Containment - These weeds are widely distributed in parts of the region. While broad scale elimination is not practicable, minimisation of the biosecurity risk posed by these weeds is reasonably practicable.

Additional species of concern - These species are a high priority for asset protection. Many are actively managed under a number of current programs, or are commercial species with a manageable biosecurity risk. It is not feasible to contain or eradicate these species, however minimising their impacts is reasonably practicable.

3 FAUNA

3.1 Introduction

This section discusses the methods used in the fauna assessment and presents the results of the assessment. Relevant databases were reviewed to identify records of locally occurring Threatened fauna species, populations and communities.

The fauna assessment consisted of:

- A review of relevant databases and literature.
- An assessment of site fauna habitats.

Site habitats were assessed in terms of their value for native fauna species on the 2nd of May 2018 in conjunction with the flora survey. The assessment focused on identifying habitat features associated with Threatened species known from the locality. Particular attention was paid to habitat features such as:

- The presence of mature trees with hollows, fissures and/or other suitable roosting/nesting places.
- Presence of hollow logs/debris and areas of dense leaf litter.
- The presence of preferred Koala food tree species.
- The presence of preferred Glossy black cockatoo feed trees.
- Condition, flow and water quality of drainage lines and bodies of water.
- Areas of dense vegetation.
- Presence of fruiting flora species and blossoming flora species, particularly winter-flowering species.
- Vegetation connectivity and proximity to neighbouring areas of vegetation.
- Presence of caves, hollow trees and/or man-made structures suitable as microchiropteran bat roost sites.

3.2 Database searches

3.2.1 NPWS Database search

A search of the NPWS Database revealed records for many Threatened fauna species within 5km of the Subject site. These species are shown in **TABLE 4**. Marine and oceanic species are not shown.

TABLE 4
NPWS DATABASE RECORDS OF THREATENED FAUNA
SPECIES WITHIN 5 KM OF THE SUBJECT SITE

Common name	Scientific name	NSW Status
Albert's Lyrebird	<i>Menura alberti</i>	V
Australasian Bittern	<i>Botaurus poiciloptilus</i>	E1
Barred Cuckoo-shrike	<i>Coracina lineata</i>	V
Black Bittern	<i>Ixobrychus flavicollis</i>	V
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	E1
Brolga	<i>Grus rubicunda</i>	V
Brush-tailed Phascogale	<i>Phascogale tapoatafa</i>	V
Bush stone-curlew	<i>Burhinus grallarius</i>	E1
Comb-crested Jacana	<i>Irediparra gallinacea</i>	V

Common name	Scientific name	NSW Status
Common Blossom-bat	<i>Syconycteris australis</i>	V
Common Planigale	<i>Planigale maculata</i>	V
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	V
Eastern Bentwing-bat	<i>Miniopterus schreibersii oceanensis</i>	V
Eastern Curlew	<i>Numenius madagascariensis</i>	V
Eastern Grass Owl	<i>Tyto longimembris</i>	V
Eastern Ground Parrot	<i>Pezoporus wallicus wallicus</i>	V
Eastern Long-eared Bat	<i>Nyctophilus bifax</i>	V
Eastern Osprey	<i>Pandion cristatus</i>	V
Flesh-footed Shearwater	<i>Ardenna carneipes</i>	V
Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i>	V
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>	V
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	V
Koala	<i>Phascolarctos cinereus</i>	V
Little Bentwing-bat	<i>Miniopterus australis</i>	V
Little Lorikeet	<i>Glossopsitta pusilla</i>	V
Long-nosed Potoroo	<i>Potorous tridactylus</i>	V
Masked Owl	<i>Tyto novaehollandiae</i>	V
New Holland Mouse	<i>Pseudomys novaehollandiae</i>	V
Olongburra Frog	<i>Litoria olongburensis</i>	V
Pied Oystercatcher	<i>Haematopus longirostris</i>	E1
Rose-crowned Fruit-Dove	<i>Ptilinopus regina</i>	V
Southern Myotis	<i>Myotis macropus</i>	V
Speckled warbler	<i>Chthonicola sagittata</i>	V
Squirrel Glider	<i>Petaurus norfolcensis</i>	V
Wallum Froglet	<i>Crinia tinnula</i>	V
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	V
Wompoo Fruit-Dove	<i>Ptilinopus magnificus</i>	V

KEY

E1	Endangered
V	Vulnerable

3.2.2 Commonwealth EPBC Act (1999) Database search

A search of the Commonwealth EPBC Act (1999) Database revealed potential suitable habitat for a number of Threatened fauna species within 5km of the Subject site. These species are shown in **TABLE 5**. Marine and oceanic species are not included in **TABLE 5**.

The Commonwealth EPBC Act Protected Matters Report is included in full in **APPENDIX A**.

TABLE 5
COMMONWEALTH EPBC ACT (1999) DATABASE OF THREATENED FAUNA
SPECIES WITH POTENTIAL SUITABLE HABITAT
WITHIN 5 KM OF THE SUBJECT SITE

Common Name	Scientific name	Status
Australasian Bittern	<i>Botaurus poiciloptilus</i>	E
Australian Painted Snipe	<i>Rostratula australis</i>	V
Australian Fritillary	<i>Argynnis hyperbius inconstans</i>	CE
Coxen's Fig-Parrot	<i>Cyclopsitta diophthalma coxeni</i>	E
Eastern bristlebird	<i>Dasyornis brachypterus</i>	E
Spotted-tail quoll	<i>Dasyurus maculatus</i>	E



Common Name	Scientific name	Status
Painted honeyeater	<i>Grantiella picta</i>	V
Black-breasted button quail	<i>Turnix melanogaster</i>	V
Giant barred frog	<i>Mixophyes iteratus</i>	E
Greater glider	<i>Petauroides volans</i>	V
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	V
Brush-tailed rock wallaby	<i>Petrogale pencillata</i>	V
Koala (combined populations of Qld, NSW and ACT)	<i>Phascolarctos cinereus</i>	V
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	V
Long-nosed Potoroo (SE mainland)	<i>Potorous tridactylus tridactylus</i>	V
Pink underwing moth	<i>Phyllodes imperialis smithersi</i>	E
New Holland Mouse	<i>Pseudomys novaehollandiae</i>	V
Red goshawk	<i>Erythrotriorchis radiatus</i>	V
Regent honeyeater	<i>Anthochaera phrygia</i>	E
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	V
Swift Parrot	<i>Lathamus discolor</i>	E
Wallum sedge frog	<i>Litoria olongburensis</i>	V
Water mouse	<i>Xeromys myoides</i>	V

KEY

- CE Critically endangered
- E Endangered
- V Vulnerable

3.3 Site assessment

3.3.1 Site habitats

The Subject site provides some areas of high quality fauna habitat. The proximity of the site to extensive areas of habitat within Broadwater National Park increases the potential value as fauna habitat for species known from this protected area.

Forested areas in the eastern part of the site contain some older growth trees with hollows and fissures suitable for hollow dwelling fauna as well as areas of dense groundcover and leaf litter providing habitat for ground-dwelling fauna. A variety of blossoming and fruiting trees and shrubs provide forage habitat for a range of nectarivorous and frugivorous birds.

The site provides potential habitat for Koalas with the preferred Koala feed trees Swamp mahogany and Scribbly gum are present at relatively low abundance within areas of Blackbutt forest and amongst Broad-leaved paperbarks.

Low-lying areas contain poorly defined drainage lines, small ponds and soaks that provide relatively high quality frog habitat. The presence of Wallum froglets is an indication of pH levels suitable for the acid frog species.

Broadwater National Park provides habitat for a diversity of reptile species including snakes, skinks; dragons and the Lace monitor as well as Gould's goanna. With the exception of reptiles requiring areas of rocky outcrops, many of these species may occur within areas of habitat in the eastern part of the Subject site.

The majority of the Subject site consists of pasture grassland featuring only scattered native trees of relatively recent regrowth. These areas have limited value as fauna habitat.

3.3.2 Significant fauna species

Two Threatened (NSW BC Act 2016, EPBC Act) fauna species were recorded during the site assessment, the Wallum froglet (*Crinia tinnula*) and the Koala (*Phascolarctos cinereus*). Wallum froglets were heard calling from two areas of standing water at the interface between Blackbutt forest and Swamp sclerophyll forest. This species is likely to extend throughout areas of inundated Swamp sclerophyll forest at suitable times. The watercourse within which Wallum froglets were recorded connects to a stream within Broadwater National Park via a culvert beneath Hills Road.

Koala scats were recorded within Blackbutt forest close to Hills Road. Koala habitat occurs throughout forested areas in the east of the site with Koalas from the Broadwater National Park population able to access site habitats via Hills Road.

3.3.3 Wildlife corridors and habitat connectivity

The Subject site does not form part of an important wildlife corridor, occurring as it does on the north-western periphery of an extensive area of habitat within Broadwater National Park. For all but the most mobile fauna species, the Richmond River together with large expanses of agricultural land form a barrier to movement to the west, north and east.

3.3.4 Potential occurrence of Threatened fauna

APPENDIX C lists the threatened fauna species known from the locality and considers the likelihood of these species occurring on the site. This Table includes species from the NPWS and EPBC databases as well as several other species known from other sources. Some of these species, particularly birds and bats, may be occasional or regular visitors to the site depending on seasonal migrations, availability of forage resources and other factors.

Based upon this assessment a large number of threatened fauna species have some limited potential to occur within the Subject site. The majority of these species are known from Broadwater National Park which provides extensive areas of habitat for these species. Many also occur within Bundjalung National Park south of the Evans River.

Areas of high quality habitat on the Subject site are restricted to Eucalypt and Swamp sclerophyll forest in the lower-lying eastern part of the site along Hills Road. The majority of the Subject site is pasture grassland which is considered to provide marginal habitat for these species at best and Threatened species known from the area are unlikely to have any significant degree of reliance on these site habitats.

4 BIODIVERSITY VALUES, IMPACTS AND AMELIORATION

4.1 Introduction

This section discusses the biodiversity values of the site as well as potential general impacts associated with the proposed rezoning and future residential development of the Subject site.

4.2 Summary of biodiversity values

The majority of the Subject site has limited biodiversity value due to historical land clearing, fragmentation and ongoing grazing and agricultural activities.

FIGURE 2 shows an area of approximately 2.1 hectares mapped as Blackbutt forest and Swamp sclerophyll woodland. This area is considered to have high conservation value on the basis that it:

- Provides known habitat for the NSW listed Threatened species Wallum froglet and the NSW and Commonwealth listed Threatened species Koala.
- Provides potential habitat for a range of other Threatened fauna species that may occur on the site over time.
- Includes areas of the NSW listed Threatened Ecological Community Swamp sclerophyll forest on floodplains.
- Includes areas of the NSW listed Threatened Ecological Community Coastal cypress pine forest.

Based on these biodiversity values, it is recommended that areas mapped as Blackbutt forest and Swamp sclerophyll woodland be protected with an appropriate environmental zoning. **APPENDIX D** shows the concept subdivision layout and proposed zoning layout for the site. Within the proposed zoning layout, areas of high conservation value are retained within a proposed E2 zoning with adjacent land within an RU1 zone with a minimum 2ha lot size.

4.3 Potential impacts

4.3.1 Flora

4.3.1.1 Direct removal of vegetation

Future residential subdivision of grassland areas of the site (Community 3) would in all likelihood result in the loss of a small number of scattered native trees and clumps of trees on the site, although trees along lot boundaries are likely to be retained. The loss of these trees, as well as extensive grassland areas, is considered likely to have a minimal impact on local biodiversity values.

4.3.1.2 Creation of edge effects and introduction of weed species to the Study area

The Subject site is already highly modified as a result of past clearing and agricultural practices. The proposed rezoning would not fragment or isolate any areas of native vegetation, provide substantial new opportunities for weeds or increase edge effects on areas of retained vegetation.



4.3.2 Fauna

4.3.2.1 Loss of fauna habitat and impacts on Broadwater National Park and neighbouring areas of habitat

Areas of higher quality fauna habitat are confined to land within Communities 1 and 2. Future residential subdivision of the site would be likely to remove grazing cattle from the site which would reduce the impact of this damaging process within areas of higher quality habitat.

Occupation of the subdivision has the potential to increase visitation to the western area of Broadwater National Park. No formal access tracks are located within this part of the park and the area is not managed for visitor access. Fire trails within the western section of the Park could potentially be used by residents of the subdivision for passive recreation, walking of dogs and so on.

4.3.2.2 Impacts on corridor values

The proposed rezoning of the site would be unlikely to have any significant negative impact on fauna movement opportunities or sever any important wildlife corridors. The Subject site does not form part of an important wildlife corridor, occurring as it does on the north-western periphery of an extensive area of habitat within Broadwater National Park. For all but the most mobile fauna species, the Richmond River together with large expanses of agricultural land form a barrier to movement to the west, north and east.

5 STATUTORY AND PLANNING ASSESSMENT

5.1 Introduction

This section includes consideration of the Proposed rezoning with regard to:

- NSW Biodiversity Conservation Act 2016; Local Land Services Act 2013 (NSW) (LLS Act) and the Local Land Services Regulation 2014 (NSW) (LLS Regulation).
- The Commonwealth Environment Protection and Biodiversity Conservation Act (1999).
- State Environmental Planning Policies (SEPP)
 - Coastal SEPP

5.2 NSW Biodiversity Conservation Act 2016; Local Land Services Act 2013 (NSW) (LLS Act) and the Local Land Services Regulation 2014 (NSW) (LLS Regulation)

Land clearing in rural areas of NSW is regulated under the Local Land Services Act 2013 (NSW) (LLS Act) and the Local Land Services Regulation 2014 (NSW) (LLS Regulation). The site is currently zoned RU1 Primary Production.

The Transitional Native Vegetation Regulatory (NVR) Map (accessed March 2020) shows the site is not mapped as *Land excluded from the LLS Act* and does not contain any areas mapped as *Sensitive Regulated Land* or *Vulnerable Regulated Land*. The NVR map has not been finalised and does not yet show areas of Category 1-Unregulated land. During the transition period landowners will be responsible for determining how Category 1 - Unregulated Land and Category 2 – Regulated Land applies to their land, in accordance with the LLS Act.



Transitional Native Vegetation Regulatory Map

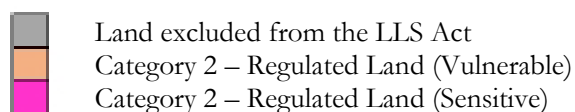


FIGURE 3 NATIVE VEGETATION REGULATORY (NVR) MAPPING

The Biodiversity Offsets Scheme Threshold is a test used to determine when it is necessary to engage an accredited assessor to apply the Biodiversity Assessment Method (the BAM) to assess the impacts of a proposal. It is used for local developments (development applications submitted to councils) and clearing that does not require development consent in urban areas and areas zoned for environmental conservation (under the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017).

The Biodiversity Conservation Regulation 2017 sets out threshold levels for when the Biodiversity Offsets Scheme will be triggered. The threshold has two elements:

- whether the amount of native vegetation being cleared exceeds a threshold area
- whether the impacts occur on an area mapped on the Biodiversity Values map published by the Minister for the Environment.

If clearing and other impacts exceeds either trigger, the Biodiversity Offset Scheme applies to the proposed development including biodiversity impacts prescribed by clause 6.1 of the Biodiversity Regulation 2017.

Under the NSW BC Act (2016), the threatened species ‘test of significance’ is used to determine if a development or activity is likely to significantly effect threatened species or ecological communities, or their habitats. It is sometimes also referred to as the ‘5-part test’. It is applied as part of the Biodiversity Offsets Scheme entry requirements and for Part 5 activities. A Biodiversity Development Assessment Report would be required if the future development is likely to ‘significantly affect threatened species’.

Based on a preliminary assessment, it is considered that future residential subdivision and occupation of areas within Community 3 would be unlikely to significantly affect any threatened species or communities. It is considered that loss of vegetation within Communities 1 and 2 would have the potential to result in significant impacts on threatened species and ecological communities and may exceed thresholds under the Biodiversity Conservation Regulation 2017. The proposed layout shown in **APPENDIX D** would retain Communities 1 and 2 within an environmental zoning.

5.3 Commonwealth EPBC Act (1999)

5.3.1 Introduction

Under the environmental assessment provisions of the EPBC Act, actions that are likely to have a significant impact on a matter of National Environmental Significance are subject to a rigorous assessment and approval process. An action includes a project, development, undertaking, activity, or series of activities. An action will require approval from the Minister if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance.

The Act identifies seven matters of national environmental significance:

- World Heritage properties
- National heritage places
- Wetlands of international importance (Ramsar wetlands)
- Threatened species and ecological communities
- Migratory species
- Commonwealth marine areas

- Nuclear actions (including uranium mining)

The EPBC Act Policy Statement 1.1 Significant Impact Guidelines (DEH 2006) outline an assessment process, including detailed criteria, to assist in deciding whether or not referral to the Minister is required. These guidelines replace the EPBC Act Administrative Guidelines of July 2000.

Based on a preliminary assessment, it is considered that future residential subdivision and occupation of areas within Community 3 would be unlikely to significantly affect any Federally listed threatened species or communities. It is considered that loss of vegetation within Communities 1 and 2 has some potential to impact upon Federally listed threatened species including the Koala. The proposed layout shown in **APPENDIX D** would retain Communities 1 and 2 within an environmental zoning.

5.4 Coastal SEPP Wetlands and Littoral Rainforests

The Subject site does not occur within or adjacent to any areas of Coastal wetlands or Littoral Rainforest protected under the Coastal SEPP.

FIGURE 4 shows mapping of Coastal wetlands and Littoral rainforest from the Coastal Management SEPP. The site does not include any mapped Coastal wetlands or Littoral rainforest and does not occur within the proximity areas for these areas.

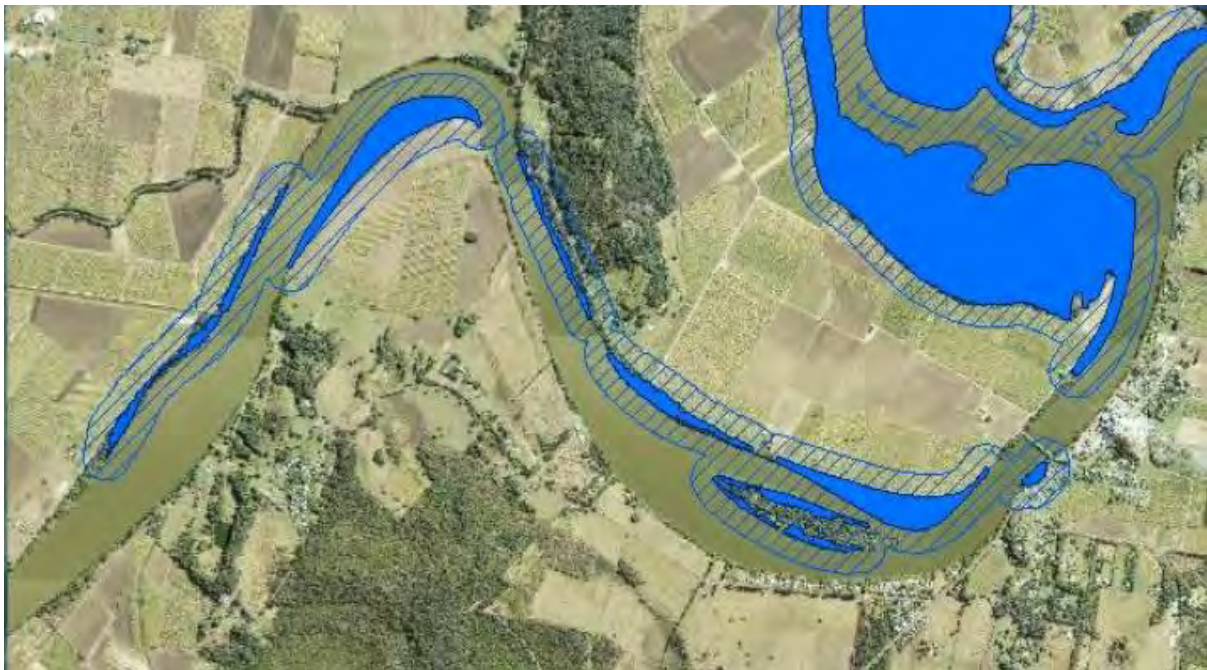


FIGURE 4 COASTAL WETLANDS (IN BLUE) AND PROXIMITY AREAS (HATCHED BLUE)

6 SUMMARY & CONCLUSIONS

Blackwood Ecological Services have been engaged by Alan Cardy to complete an Ecological Assessment for a proposed rezoning of land at Hills Road, Rileys Hill. The land is proposed to be rezoned to allow for residential subdivision and development. The Ecological assessment is to include land within Lot 100 DP 1201719. The assessment is to involve initial field survey and provision of a report advising of key ecological issues. This assessment includes vegetation mapping and consideration of relevant database results and ecological mapping.

The Subject site is located to the immediate south of the existing residential area of Rileys Hill and is an area of approximately 8.27 hectares. The site is accessed via Hills Road which forms the eastern boundary of the site. The western section of Broadwater National Park is located on the other side of Hills Road. Broadwater National Park is an area of 4,290 hectares of wet and dry heathland, eucalypt forest, swampland and woodland. The park extends from near the village of Evans Head in the south, northwards towards the village of Broadwater and includes 9 kilometres of coastline.

Site surveys were undertaken on the 2nd of May 2018. The site is currently used for grazing and consists predominantly of grassland with forested vegetation in lower lying areas along the eastern boundary. The majority of the site consists of mixed grazed pasture grassland with patches of Blady grass and occasional weeds including Fireweed and, in wetter areas, Cuphea. Forested vegetation in the eastern part of the site is generally a continuum of forest within the western edge of Broadwater National Park which is located on the other side of Hills Road. The canopy is dominated by Blackbutt with a diversity of other eucalypts including Scribbly gum, Pink bloodwood, Red mahogany and Thin-leaved stringybark. Swamp turpentine and Brushbox are present and the midstorey includes patches of Coastal cypress pine, Hard quandong, Duboisia, Brush ironbark wattle, Cheese tree, Satinash, Leptospermums, Cabbage palm and other species.

The area of Blackbutt closed forest is fringed by an area of Broad-leaved paperbark forest of mixed age, with larger trees present closer to the Blackbutt forest and more recent regrowth further to the edges. Pink Euodia, Cabbage palm and Umbrella cheese tree are also present and the groundcover is dominated by Red-fruited saw-sedge. Swamp mahogany is present in this community but is not common. The edges of this community feature sparse growth of Broad-leaved paperbark with Red-fruited saw-sedge and scattered Slash pine amongst a grassy groundcover of native and exotic species.

Areas of mixed Blackbutt forest do not meet the definition of any listed Threatened ecological community under the NSW Biodiversity Conservation Act 2016 or Commonwealth EPBC Act 1999. This community type does contain patches of Coastal cypress pine forest that are protected as the TEC *Coastal cypress pine forest in the NSW North Coast Bioregion*. Areas of Broad-leaved paperbark forest on the site meet the definition of the Threatened Ecological Community *Swamp sclerophyll forest on floodplains*. These areas are considered to have a high conservation value. Areas of pasture grassland with scattered trees do meet the definition of any TECs and have limited conservation value.

No Threatened flora species were recorded during the site survey. Hairy joint grass was not recorded on the site despite targeted searches in wetter grassland patches and throughout the site. The NPWS Atlas database search did not show any records of this species within 5km of the Subject site and it is not known to occur in the Study area.

Two Threatened (NSW BC Act 2016 , EPBC Act) fauna species were recorded during the site assessment, the Wallum froglet (*Crinia tinnula*) and the Koala (*Phascolarctos cinereus*). Wallum froglets were heard calling from two areas of standing water at the interface between Blackbutt forest and Swamp sclerophyll forest. This species is likely to extend throughout areas of inundated Swamp sclerophyll forest at suitable times. Koala scats were recorded within Blackbutt forest close to Hills Road. Koala habitat occurs throughout forested areas in the east of the site with Koalas from the Broadwater National Park population able to access site habitats via Hills Road.

A large number of threatened fauna species have some limited potential to occur within the Subject site. The majority of these species are known from Broadwater National Park which provides extensive areas of habitat for these species. Many also occur within Bundjalung National Park south of the Evans River. The Subject site does not form part of an important wildlife corridor, occurring as it does on the north-western periphery of an extensive area of habitat within Broadwater National Park. For all but the most mobile fauna species, the Richmond River together with large expanses of agricultural land form a barrier to movement to the west, north and east.

Future residential subdivision of grassland areas of the site (Community 3) would in all likelihood result in the loss of a small number of scattered native trees and clumps of trees on the site, although trees along lot boundaries are likely to be retained. The loss of these trees, as well as extensive grassland areas, is considered likely to have a minimal impact on local biodiversity values.

The Subject site does not occur within or adjacent to any areas of Coastal wetlands or Littoral Rainforest protected under the Coastal SEPP.

Areas of high quality habitat on the Subject site are restricted to Eucalypt and Swamp sclerophyll forest in the lower-lying eastern part of the site along Hills Road. **FIGURE 2** shows an area of approximately 2.1 hectares mapped as Blackbutt forest and Swamp sclerophyll woodland. This area is considered to have high conservation value on the basis that it:

- Provides known habitat for the NSW listed Threatened species Wallum froglet and the NSW and Commonwealth listed Threatened species Koala.
- Provides potential habitat for a range of other Threatened fauna species that may occur on the site over time.
- Includes areas of the NSW listed Threatened Ecological Community (TEC) Swamp sclerophyll forest on floodplains.
- Includes areas of the NSW listed TEC Coastal cypress pine forest.

The Ecological assessment completed in 2018 recommended that areas mapped as Blackbutt forest and Swamp sclerophyll woodland be protected with an appropriate environmental zoning. **APPENDIX D** shows the concept subdivision layout and proposed zoning layout for the site.

Following initial site investigations and on-going detailed communications with Council, the Planning Proposal has been modified such that there has been:

- a significant reduction in the proposed footprint/area of the RU5 zone
- an increase in the mapped minimum lot size to 800m² for the RU5 zoned land
- the inclusion of an E2 – Environmental Conservation Zone over part of the land with a 2ha minimum lot size



As a consequence of the above, there has been a significant reduction in the potential lot yield as originally proposed, from 70 residential lots down to 35 residential lots (which will be zoned RU5) and one single dwelling opportunity lot (which will be zoned part RU1 and part E2). This proposed zoning is considered to be appropriate based on the assessment of biodiversity values across the site.



7 REFERENCES

Ardill Payne & Partners (2017) **Planning Proposal/LEP Amendment Request. Lot 100 DP 1201719, Hills Road, Rileys Hill.** Submission to Richmond Valley Council.

Department of Environment & Conservation (2005) **Threatened species assessment guidelines. The assessment of significance.**

Department of Environment & Conservation (2011). **Threatened species, populations and ecological communities.** www.threatenedspecies.environment.nsw.gov.au

Higgins, P.J. (Ed.) (1999) **Handbook of Australian, New Zealand and Antarctic Birds.** Oxford University Press, Melbourne.

NPWS (2002) **Threatened Species of the Upper North Coast of NSW – Flora.** NPWS Northern Directorate, Coffs Harbour.

Office of Environment and Heritage (2012) **Broadwater National Park Plan of Management.**



APPENDIX A

**COMMONWEALTH EPBC DATABASE PROTECTED MATTERS
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.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

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[Summary](#)

[Details](#)

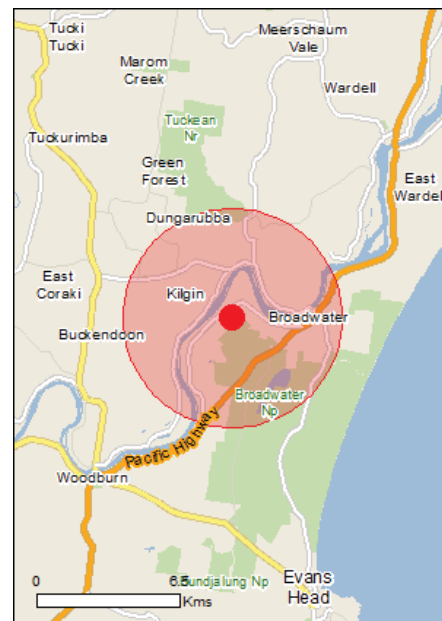
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

[Coordinates](#)

Buffer: 5.0Km



Summary

Matters of National Environmental 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:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	68
Listed Migratory Species:	45

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 <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 Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	50
Whales and Other Cetaceans:	1
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	2
Regional Forest Agreements:	1
Invasive Species:	40
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [\[Resource Information \]](#)

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

Name	Status	Type of Presence
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community likely to occur within area

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

Name	Status	Type of Presence
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Birds

Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat known 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
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat may occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area
Fish		
Epinephelus daemeli Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Nannoperca oxleyana Oxleyan Pygmy Perch [64468]	Endangered	Species or species habitat known to occur within area
Frogs		
Litoria olongburensis Wallum Sedge Frog [1821]	Vulnerable	Species or species habitat known to occur within area
Mixophyes fleayi Fleay's Frog [25960]	Endangered	Species or species habitat may occur within area
Insects		
Argynnis hyperbius inconstans Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may 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 likely to occur within area
Petauroides volans Greater Glider [254]	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]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	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	Roosting known to occur within area
Xeromys myoides Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat may occur within area
Plants		
Acronychia littoralis Scented Acronychia [8582]	Endangered	Species or species habitat likely to occur within area
Allocasuarina thalassoscopica [21927]	Endangered	Species or species habitat may occur within area
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area
Baloghia marmorata Marbled Baloghia, Jointed Baloghia [8463]	Vulnerable	Species or species habitat may occur within area
Cryptocarya foetida Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat may occur within area
Desmodium acanthocladum Thorny Pea [17972]	Vulnerable	Species or species habitat likely to occur within area
Endiandra floydii Floyd's Walnut [52955]	Endangered	Species or species habitat may occur within area
Endiandra hayesii Rusty Rose Walnut, Velvet Laurel [13866]	Vulnerable	Species or species habitat likely to occur within area
Floydia praealta Ball Nut, Possum Nut, Big Nut, Beefwood [15762]	Vulnerable	Species or species habitat likely to occur within area
Gossia fragrantissima Sweet Myrtle, Small-leaved Myrtle [78867]	Endangered	Species or species habitat known to occur within area
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat may occur within area
Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat likely to occur within area
Marsdenia longiloba Clear Milkvine [2794]	Vulnerable	Species or species habitat may occur within area
Ochrosia moorei Southern Ochrosia [11350]	Endangered	Species or species habitat known to occur within area
Owenia cepiodora Onionwood, Bog Onion, Onion Cedar [11344]	Vulnerable	Species or species habitat likely to occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat likely to occur within area
Rutidosis heterogama Heath Wrinklewort [13132]	Vulnerable	Species or species habitat may occur within area
Syzygium hodgkinsoniae Smooth-bark Rose Apple, Red Lilly Pilly [3539]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area

Name	Status	Type of Presence
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Congregation or aggregation known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat may occur within area
Saiphos reticulatus Three-toed Snake-tooth Skink [88328]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species

[Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Thalassarche cauta Shy Albatross [89224]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Species or species habitat likely to occur within area
Migratory Marine Species		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Congregation or aggregation known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		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 known to occur

Name	Threatened	Type of Presence
Monarcha trivirgatus Spectacled Monarch [610]		within area Species or species habitat known 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 known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Species or species habitat may occur within

Name	Threatened	Type of Presence area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known 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
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known 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 known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Puffinus griseus Sooty Shearwater [1024]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Species or species habitat likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Congregation or aggregation known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat may occur within area
Whales and other Cetaceans		
[Resource Information]		
Name	Status	Type of Presence
Mammals		
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves [\[Resource Information \]](#)

Name	State
Broadwater	NSW
Tuckean	NSW

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

Note that all areas with completed RFAs have been included.

Name	State
North East NSW RFA	New South Wales

Invasive Species [\[Resource Information \]](#)

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species

Name	Status	Type of Presence
Frogs		
Rhinella marina Cane Toad [83218]		Habitat likely to occur within area Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus africanus Climbing Asparagus, Climbing Asparagus Fern [66907]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area
Nationally Important Wetlands		
		[Resource Information]
Name	State	
Tuckean Swamp	NSW	

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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.

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

Where very little information is available for 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 reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

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

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

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

Coordinates

-29.01581 153.39825

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.

APPENDIX B FLORA SPECIES LIST

Flora species list Hills Road, Rileys Hill

Where uncertainty exists due to the unavailability of reproductive material, the taxon is preceded by a question mark, or plants are identified to genus level only. Botanical nomenclature follows G.J. Harden (ed) (1990-2002) Flora of New South Wales, UNSW Press, except where recent changes have occurred.

Notes:

- * Denotes an introduced species as well as non-local native species.
BOLD Species of conservation significance are bolded.

Family	Botanical Name	Common Name
Ferns and Fern Allies		
Blechnaceae	<i>Blechnum cartilagineum</i>	Gristle fern
	<i>Blechnum indicum</i>	Swamp water fern
	<i>Doodia aspera</i>	Prickly rasp fern
Dennstaedtiaceae	<i>Hypolepis muelleri</i>	Harsh ground fern
	<i>Pteridium esculentum</i>	Bracken fern
Dicksoniaceae	<i>Calochlaena dubia</i>	Soft bracken
Glecheniaceae	<i>Histiopteris incisa</i>	Batswing fern
Polypodiaceae	<i>Platynerium superbum</i>	Staghorn fern
Lygodiaceae	<i>Lygodium microphyllum</i>	Climbing fern
Gymnosperms		
Cupressaceae	<i>Callitris columellaris</i>	Coastal cypress pine
Pinaceae	<i>Pinus elliotii</i> *	Slash pine
Monocotyledons		
Araceae	<i>Monstera deliciosa</i> *	Monstereo
Arecaceae	<i>Livistona australis</i>	Cabbage palm
Commelinaceae	<i>Commelina cyanea</i>	Native commelina
Cyperaceae	<i>Cyperus gracilis</i>	
	<i>Cyperus polystachyos</i>	
	<i>Cyperus</i> sp.	
	<i>Gahnia clarkei</i>	Tall saw sedge
Juncaceae	<i>Juncus usitatus</i>	Common rush
Lomandraceae	<i>Lomandra longifolia</i>	Spiny-headed matrush
Orchidaceae	<i>Cymbidium</i> sp.	
Phormiaceae	<i>Dianella caerulea</i>	Blue flax lily
Poaceae	<i>Andropogon virginicus</i> *	Whisky grass
	<i>Cymbopogon refractus</i>	Barbed wire grass
	<i>Cynodon dactylon</i>	Couch grass
	<i>Imperata cylindrica</i>	Blady grass
	<i>Oplismenus aemulus</i>	Basket grass
	<i>Ottobloa gracillima</i>	Pademelon grass
	<i>Paspalum</i> sp.*	
	<i>Paspalum dilatatum</i> *	Paspalum
	<i>Pennisetum clandestinum</i> *	Kikuyu

Family	Botanical Name	Common Name
	<i>Poa labillardierei</i> var. <i>labillardierei</i>	Tussock grass
	<i>Sporobolus</i> sp.	
Restionaceae	<i>Baloskion tetraphyllum</i>	
Smilacaceae	<i>Smilax australis</i>	Austral sarsparilla
	<i>Smilax glycyphylla</i>	Sweet sarsparilla
Xanthorrhoeaceae	<i>Xanthorrhoea</i> sp.	Grass tree
Dicotyledons		
Apiaceae	<i>Centella asiatica</i>	Centella
	<i>Hydrocotyle laxiflora</i>	Stinking pennywort
Apocynaceae	<i>Parsonsia straminea</i>	Common silkpod
	<i>Tabernaemontana pandacaqui</i>	Banana bush
Asclepiadaceae	<i>Asclepias curassavica</i> *	Redhead cotton bush
	<i>Marsdenia rostrata</i>	Milk vine
Asteraceae	<i>Ageratina adenophora</i> *	Crofton weed
	<i>Ageratum houstonianum</i> *	Blue billygoat weed
	<i>Ambrosia artemisiifolia</i> *	Annual ragweed
	<i>Bidens pilosa</i> *	Cobblers pegs
	<i>Conyza</i> sp.*	Fleabane
	<i>Senecio madagascariensis</i> *	Fireweed
	<i>Taraxacum officinale</i>	Dandelion
Caesalpinioideae	<i>Delonix regia</i> *	Royal poinciana
	<i>Senna didymobotrya</i>	Popcorn senna
	<i>Senna pendula</i> var. <i>glabrata</i> *	Senna
	<i>Senna septemtrionalis</i> *	Smooth senna
Campanulaceae	<i>Lobelia purpurescens</i>	White root
Convolvulaceae	<i>Ipomoea cairica</i> *	Coastal morning glory
Dilleniaceae	<i>Hibbertia scandens</i>	Climbing guinea flower
Elaeocarpaceae	<i>Elaeocarpus obovatus</i>	Hard quandong
	<i>Elaeocarpus reticulatus</i>	Blueberry ash
Euphorbiaceae	<i>Alchornea ilicifolia</i>	Native holly
	<i>Breynia oblongifolia</i>	Coffee bush
	<i>Drypetes deplanchei</i>	Yellow tulipwood
	<i>Glochidion ferdinandi</i> var. <i>ferdinandi</i>	Cheese tree
	<i>Glochidion sumatranum</i>	Umbrella cheese tree
Fabaceae	<i>Hardenbergia violacea</i>	False sarsparilla
	<i>Hovea acutifolia</i>	Brush hovea
	<i>Kennedia rubicunda</i>	Red coral pea
Lauraceae	<i>Cassytha</i> sp.	Devil's twine
	<i>Endiandra sieberi</i>	Hard corkwood
Luzuriagaceae	<i>Eustrephus latifolius</i>	Wombat berry
	<i>Geitonoplesium cymosum</i>	Scrambling lily
Malvaceae	<i>Hibiscus heterophyllus</i>	Native rosella
Menispermaceae	<i>Stephania japonica</i> var. <i>discolor</i>	Snake vine
Mimosaceae	<i>Acacia disparrima</i> subsp. <i>disparrima</i>	Brush ironbark wattle
	<i>Acacia melanoxydon</i>	Blackwood wattle
	<i>Acacia ulicifolia</i>	Prickly moses
Moraceae	<i>Maclura cochinchinensis</i>	Cockspur
Myrsinaceae	<i>Myrsine howittiana</i>	Brush muttonwood



Family	Botanical Name	Common Name
Myrtaceae	<i>Astromyrtus dulcis</i>	Midgenberry
	<i>Callistemon salignus</i>	Willow bottlebrush
	<i>Callistemon viminalis</i>	Weeping bottlebrush
	<i>Corymbia intermedia</i>	Pink bloodwood
	<i>Eucalyptus eugenioides</i>	Thin-leaved stringybark
	<i>Eucalyptus pilularis</i>	Blackbutt
	<i>Eucalyptus resinifera</i>	Red mahogany
	<i>Eucalyptus robusta</i>	Swamp mahogany
	<i>Eucalyptus signata</i>	Scribbly gum
	<i>Lophostemon confertus</i>	Brushbox
	<i>Lophostemon suaveolens</i>	Swamp turpentine
	<i>Melaleuca nodosa</i>	
	<i>Melaleuca quinquenervia</i>	Broad-leaved paperbark
	<i>Rhodamnia rubescens</i>	Scrub turpentine
Oleaceae	<i>Syzygium australe</i>	Brush cherry
	<i>Notelaea longifolia</i> var. <i>intermedia</i>	Large mock olive
Proteaceae	<i>Banksia aemula</i>	Wallum banksia
	<i>Grevillea robusta</i>	Silky oak
	<i>Macadamia integrifolia</i>	Macadamia nut
Rhamnaceae	<i>Alphitonia excelsa</i>	Red ash
Rubiaceae	<i>Pomax umbellata</i>	
Rutaceae	<i>Flindersia schottiana</i>	Cudgerie
	<i>Melicope elleryana</i>	Pink-flowered doughwood
	<i>Nematolepis squamea</i> subsp. <i>squamea</i>	Satinwood
Sapindaceae	<i>Cupaniopsis anacardioides</i>	Tuckeroo
	<i>Dodonaea triquetra</i>	Hopbush
	<i>Jagera pseudorbis</i>	Foambark
Solanaceae	<i>Duboisia myoporoides</i>	Duboisia
Verbenaceae	<i>Lantana camara</i> *	Lantana
	<i>Verbena bonariensis</i> *	Purple top
Vitaceae	<i>Cissus antarctica</i>	Water vine



APPENDIX C

LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES



**TABLE D1
LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES**

Species	Notes	Likelihood of occurrence on site
Amphibians		
Wallum froglet	The Wallum froglet is found in Wallum habitats such as Paperbark swamps and coastal heath as well as adjacent grassland and drains with low pH waters.	Recorded on site during current survey
Wallum sedge frog	The Wallum sedge frog occurs in permanent or semi-permanent ponds and pools in Wallum habitats such as Paperbark swamps and coastal heath.	Unlikely, records from Broadwater NP are all east of Pacific Highway
Forest and woodland birds		
Black-breasted button-quail	Preferred habitat includes drier low closed forests, including dry rainforests, vine forest and vine thickets, often in association with Hoop Pine, and Bottletree scrubs. The understorey may be dense or sparse, but a deep, moist leaf-litter layer, in which the birds forage, is an important component of habitat.	Unlikely
Albert's Lyrebird	Wettest rainforests or wet sclerophyll forests, with mesic understorey. Higher densities associated with a canopy of eucalypts compared with rainforest lacking eucalypts. Feed on the ground, usually where there is a deep, moist layer of leaf-litter, and fallen logs. In NSW, usually forage in rather open areas without a dense layer but with a well-developed taller strata.	Unlikely
Barred Cuckoo-shrike	Rainforest, eucalypt forests and woodlands, clearings in secondary growth, swamp woodlands and timber along watercourses. They are usually seen in pairs or small flocks foraging among foliage of trees for insects and fruit. They are active birds, frequently moving from tree to tree.	Possible
Black-breasted button-quail	There are few reliable records of this species in NSW. It prefers drier rainforests and viney scrubs, often in association with a deep moist leaf-litter layer.	Unlikely
Dusky woodswallow	The Dusky Woodswallow is found in open forests and woodlands, and may be seen along roadsides and on golf courses.	Possible
White-bellied sea-eagle	White-bellied Sea-Eagles are normally seen perched high in a tree, or soaring over waterways and adjacent land. Birds form permanent pairs that inhabit territories throughout the year. White-bellied Sea-Eagles build a large stick nest, which is used for many seasons in succession. The nest can be located in a tree up to 30m above the ground, but may also be placed on the ground or on rocks, where there are no suitable trees	Possible



Species	Notes	Likelihood of occurrence on site
Eastern ground parrot	The Ground Parrot occurs in high rainfall coastal and near coastal low heathlands and sedgeland, generally below one metre in height and very dense (up to 90% projected foliage cover). These habitats provide a high abundance and diversity of food, adequate cover and suitable roosting and nesting opportunities for the Ground Parrot, which spends most of its time on or near the ground. The species is found in small numbers on the north coast (Broadwater, Bundjalung, Yuraygir NPs).	Unlikely
Grass owl	Eastern Grass Owls are found in areas of tall grass, including grass tussocks, in swampy areas, grassy plains, swampy heath, and in cane grass or sedges on flood plains.	Possible
Grey-crowned Babbler (eastern subspecies)	Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains.	Possible
Little lorikeet	Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophoras, Melaleucas and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity.	Possible
Masked owl	Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. Pairs have a large home-range of 500 to 1000 hectares. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	Possible
Rose-crowned fruit-dove	The Rose-crowned fruit dove prefers tall tropical and subtropical evergreen or semi-deciduous rainforest, especially with a dense regrowth of vines.	Possible
Wompoo fruit dove	This species is primarily associated with large undisturbed patches of tropical or subtropical evergreen rainforest.	Unlikely
Oceanic and coastal birds		
Brolga	Found in shallow swamps, dry grassland or ploughed paddocks and desert claypans.	Possible
Osprey	Ospreys forage in coastal rivers and streams. They prefer to nest in tall trees closer to coastal waterbodies.	Possible
Wetland birds		
Australasian bittern	The Australasian bittern generally prefers freshwater habitats although it may also use dense saltmarsh vegetation in estuaries and flooded grasslands.	Unlikely
Black bittern	This species occupies forested fresh rivers, tidal creeks and coastal inlets.	Possible



Species	Notes	Likelihood of occurrence on site
Black-necked stork	The Black-necked stork uses grassland and wetland habitats in the locality during periods of inundation.	Possible
Comb-crested jacana	Found in dams, still or slow-flowing wetlands and other waterbodies with floating waterlilies or other floating or dense fringing vegetation.	Unlikely
Terrestrial mammals		
Common planigale	This species occupies a wide range of habitats including rainforest, sclerophyll forest, grasslands, marshlands, rocky areas and even some suburban areas.	Possible
Koala	There is no known Koala population resident in the surrounding area, although individuals may pass through the Study area at times. The Subject site contains Swamp mahogany, a known preferred Koala food tree.	Recorded on site
Long-nosed potoroo	This species occurs in coastal heathland habitats at several locations along the Far North Coast.	Unlikely
Spotted-tail quoll	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Quolls are rarely recorded in the locality.	Unlikely
New Holland Mouse	Across the species' range the New Holland Mouse is known to inhabit open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes.	Possible
Squirrel Glider	Inhabit dry eucalypt forest and woodland. In coastal areas they occupy Blackbutt, Bloodwood and Ironbark eucalypt forest with heath understorey. Inland they are found predominately in box-ironbark woodlands and River red gum forests. They require abundant tree hollows for refuge and nesting.	Possible
Brush-tailed phascogale	Prefers dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter.	Possible
Bats		
Common blossom bat	Common Blossom Bats feed on nectar-producing plants and typically roost in dense rainforest vegetation including Cabbage palms..	Possible



Species	Notes	Likelihood of occurrence on site
Eastern bentwing bat (common)	This species generally occupies caves and tunnels during the day and, at night, forages for small insects beneath the canopy of well timbered habitats. The Eastern bent-wing bat may utilise the site as forage habitat.	Possible
Eastern long-eared bat	This species typically roosts in old growth trees with hollows. It may occasionally roost in dense forested vegetation and dead rainforest foliage. The Study area may be used for foraging or roosting by this species.	Possible
Greater broad-nosed bat	This species forages over a range of habitats, including rainforest and moist forests.	Possible
Grey-headed flying fox	This species occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Urban gardens and cultivated fruit crops also provide habitat for this species.	Possible
Little bent-wing bat	This species generally roosts in caves and tunnels during the day and forages for insects beneath the canopy of forested habitats at night. The Little bent-wing bat may utilise the site as forage habitat.	Possible
Southern myotis	This species forages over fresh and saline waterbodies and roosts in caves, tree hollows, culverts, tunnels and other man-made structures.	Possible



**APPENDIX D
CONCEPT SUBDIVISION LAYOUT AND PROPOSED ZONING LAYOUT**

