BIODIVERSITY ASSESSMENT

RESIDENTIAL AGED CARE FACILITY,
7 MARTIN CLOSE & 42 STRONACH AVENUE, EAST MAITLAND

June 2020

Project Number: 20-172

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ACRONYMS AND ABBREVIATIONS

AoS	Assessment of Significance (under the EPBC Act)
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BDAR	Biodiversity Development Assessment Report
BFMP	Bushfire Management Plan
Biosecurity Act	*Biosecurity Act 2015*
BOM	Bureau of Meteorology
BOS	Biodiversity Offsets Scheme
Cwth	Commonwealth
DPI	Department of Primary Industries
EEC	Endangered Ecological Community – as defined under relevant law applying to the proposed work area
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwth)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
GDE	Groundwater Dependent Ecosystem
FM Act	*Fisheries Management Act 1994*
ha	hectares
Km	kilometres
LGA	Local Government Area
m	Metres
MNES	Matters of National Environmental Significance
NSW	New South Wales
OEH	(NSW) Office of Environment and Heritage, formerly Department of Environment, Climate Change
PCT	Plant Community Type
PMST	Protected Matters Search Tool
Roads and Maritime	Roads and Maritime Services
SEPP 44	State Environmental Planning Policy No 44 – Koala Habitat Protection
SIS	Species Impact Statement
sp./spp.	Species/multiple species
TEC	Threatened Ecological Community
ToS	Test of Significance under the BC Act
VIS	Vegetation Information System

1 INTRODUCTION AND BACKGROUND

1.1 PROJECT DESCRIPTION AND SCOPE

Fresh Hope Care propose to undertake further development of seniors housing and amenities at a residential aged care facility in East Maitland. The proposal site has an approximate area of 2.7 ha and is comprised of the following addresses and lots in Table 1-1:

Table 1-1 Summary of affected properties and lots

Address	Lot	DP
7 Martin Close, East Maitland	57	DP260833
42 Stronach Avenue, East Maitland	5	DP258655
Maintenance zone/Council reserve	58	DP260833
	61	DP262743
	Part 2060	DP1045875
	3	DP258655

Fresh Hope Care intends to redevelop the proposal site and include the following:

- 160 residential aged care beds
- 8 overnight respite care units
- Shared facilities for residents and visitors including:
    - Café
    - Wellness centre
    - Allied health rooms
    - Hairdressing salon
    - Library
- Facility management offices
- Commercial kitchen and laundry accessed via a basement loading dock

Additionally, future vegetation management and maintenance within the Maintenance Zone (Figure 1-1) is required, though no direct impacts are proposed immediately. The Maintenance Zone which forms part of the Asset Protection Zone (APZ), will be subject to future maintenance as outlined in the Two Mile Creek Bushfire management Plan (BFMP) currently with Council for review. This is required to maintain vegetation density at its current levels, to reduce bushfire risk and therefore, this area has been included within this biodiversity assessment for indirect impacts only.

This report contains an assessment of the likely impacts of the proposal and recommends mitigation measures for them. The proposal site is indicated in Figure 1-1.

Table 1-2 Description of proposal site

Site	Easting	Northing	Description	Image
Proposal site	367991	6373825	Previously disturbed vegetation within the proposal site that includes a combination of remnant native vegetation and native and exotic landscape plantings	
Maintenance zone	367963	6373982	Riparian area that forms part of future maintenance requirements of the APZ	

1.1.1 Definitions

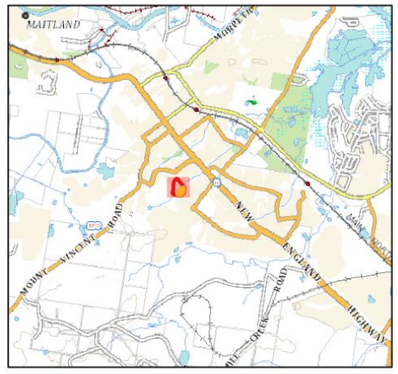
For the purposes of this report, the following definitions apply:

- *Proposal site*: the area directly impacted by the proposed works including ancillary facilities (indicative only).
- *Maintenance zone:* the area that may necessitate future maintenance requirements to maintain vegetation density and cover levels in order to comply with APZ requirements stated within the Two Mile Creek BFMP. Note, no direct impacts are proposed currently as part of this assessment and Development Application (DA) as the maintenance zone currently complies with the requirements for an Inner Protection Area.
- *Study area*: the area surveyed for the purposes of this assessment including the proposal site and immediate surrounds.
- The *locality* is defined as the area within a 10 km radius of the study area.

Fresh Hope Care
Proposal Site

Legend

- Study Area
- Proposal Area
- Maintenance Zone
- Waterways



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Fresh Hope Care
Author: sarah.d
Date created: 07.05.2020
Datum: GDA94 / MGA zone 56

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Figure 1-1 Location of proposal and study area

2 STATUTORY CONSIDERATIONS

2.1 NSW ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 (EP&A ACT)

The *Environmental Planning and Assessment Act 1979* (EP&A Act) provides the framework for the assessment of projects under the following regimes:

- Division 4.1 applies to projects that require development consent from a consent authority (usually a local council). A statement of environmental effects or environmental impact statement (for designated development) is prepared to assess environmental impacts.

This proposal is being assessed under Division 4.1 of the EP&A Act. Section 1.7 of the EP&A Act requires that the significance of the impact of the proposal on terrestrial and aquatic threatened species, populations and endangered ecological communities is assessed as per the *Biodiversity Conservation Act 2016*.

2.2 NSW BIODIVERSITY CONSERVATION ACT 2016 (BC ACT)

The BC Act outlines the framework for addressing impacts on biodiversity from development and clearing and sets out to:

- Conserve biological diversity and promote ecologically sustainable development;
- Prevent the extinction and promote the recovery of threatened species, populations and ecological communities;
- Protect the habitat of those species, populations and ecological communities that are endangered;
- Eliminate or manage certain threatening processes;
- Ensure proper assessment of activities impacting threatened species, populations and ecological communities, and
- Encourage the conservation of threatened species, populations and ecological communities through co-operative management.

Together with the *Biodiversity Conservation Regulation 2017*, it establishes a framework to avoid, minimise and offset impacts on biodiversity from development through the Biodiversity Offsets Scheme. The Biodiversity Offsets Scheme creates a transparent, consistent and scientifically based approach to biodiversity assessment and offsetting for all types of development that are likely to have a significant impact on biodiversity. It also establishes biodiversity stewardship agreements, which are voluntary in-perpetuity agreements entered into by landholders, to secure offset sites.

A Biodiversity Assessment Methodology (BAM) assessment, pursuant to the Act, is required for Part 4 developments that trigger the NSW Biodiversity Offsets Scheme (BOS) Thresholds. The proposal can be assessed under a streamlined assessment module for small areas as set out by the BAM. To determine whether the BOS would be triggered for the proposal, the following applies:

1. On the Maitland Shire Council Local Environmental Plan, the proposal site is associated with a minimum lot size of 450 m^2. Given this, clearing of native vegetation in excess of 0.25 ha would trigger entry to the BOS including the need for a detailed Biodiversity Development Assessment Report (BDAR) which will may generate an offset liability.

2. An initial site survey has verified that clearing of all native vegetation within the proposal site would equate to the removal of a conservative amount up to a maximum of 0.17 ha of native vegetation, therefore not exceeding the BOS threshold (note, not all native vegetation on the site is intended to be cleared)
3. An additional trigger for entry into the BOS is intersecting the OEH Biodiversity Values Mapping. Investigations demonstrate that proposal site is not mapped on the Biodiversity Values Map.
4. An additional trigger occurs where the clearing has the potential to generate a significant impact on a threatened entity (such as a listed ecological community, species or population). Habitat assessment detailed in Appendix C determined a low likelihood of impacts on threatened flora and fauna, therefore no Tests of Significance (ToS) are required.

It is therefore concluded that the proposal will not trigger entry into the BOS. Note, as no direct impacts within the maintenance zone will occur currently and are part of this assessment, this area has been excluded from the BOS thresholds calculations.

2.2.1 Significance of Impact

If proposed works are likely to impact on a listed (threatened) species or ecological community, s 7.3 of the BC Act contains five factors that can be used to determine whether the impact on the entity will be significant or not. Where a significant impact is likely to occur, a Species Impact Statement (SIS) or a Biodiversity Development Assessment Report (BDAR) must be prepared. The content of an SIS is outlined in ss 7.20-21 of the BC Act and includes requesting the Chief Executive's requirements.

Section 5 of this report discusses the potential impacts of the proposal on threatened species, populations or TECs in the vicinity of the proposal site.

2.3 BIOSECURITY ACT 2015

The *Biosecurity Act 2015* (Biosecurity Act) and its subordinate legislation commenced on the 1 July 2017. The Biosecurity Strategy 2013-2021 and Biosecurity Act (which repealed the *Noxious Weeds Act 1993*) provide a streamlined, clear framework for safeguarding primary industries, natural environments and communities from a range of pests, diseases and weeds. The broad objectives for of this Act and for biosecurity in NSW are to manage biosecurity risks from animal and plant pests and diseases, weeds and contaminants by:

- preventing their entry into NSW
- quickly finding, containing and eradicating any new entries
- effectively minimising the impacts of those pests, diseases, weeds and contaminants that cannot be eradicated through robust management arrangements.

The Biosecurity Act provides a flexible and responsive statutory framework to help achieve these objectives for the benefit of the NSW economy, environment and community. Priority weeds identified within the study area and associated impacts are assessed in Section 5.

2.4 NSW FISHERIES MANAGEMENT (FM) ACT 1994

The objects of the *Fisheries Management Act 1994* (FM Act) are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. The Act sets out to ensure that

the impact of any action affecting threatened species, populations and ecological communities of fish and marine vegetation is properly assessed. Amongst other matters, the FM Act sets out to develop habitat protection plans and protect marine vegetation and other habitats. It also sets out criteria for the issue of licenses or ministerial orders for activities likely to harm protected or threatened species, populations or ecological communities or damage critical habitats. As Two Mile Creek is classified as an ephemeral Second Order (under the Strahler system) waterway and is not critical fish habitat, the proposal does not require a permit under the act.

2.5 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999 (CWTH)

The EPBC Act protects nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as Matters of National Environmental Significance (MNES).

MNES relevant to the proposal are:

- Wetlands of international importance
- Nationally threatened species and ecological communities
- Migratory species
- Commonwealth marine areas

Significance of impacts is determined in accordance with the *Significance impact guidelines 1.1 – matters of national environmental significance* (Department of the Environment, 2013).

Where a proposal is likely to have a significant impact on a MNES, the proposal is referred to the Federal Environment Minister. The referral process involves a decision on whether or not the proposal is a controlled action. When a proposal is declared a controlled action, approval from the Minister is required. Further information on the referral and approval process is available at http://www.environment.gov.au/protection/environment-assessments/assessment-and-approval-process.

No threatened species listed under the EPBC Act are considered to be potentially impacted by the proposal. See section 4.4 below for details.

2.6 STATE ENVIRONMENTAL PLANNING POLICY (COASTAL MANAGEMENT) 2018

The aim of this Policy is to promote an integrated and co-ordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the *Coastal Management Act 2016.* Coastal Management SEPP coastal wetlands land is located approximately 5 km south-east and would not be impacted by the proposal.

2.7 STATE ENVIRONMENTAL PLANNING POLICY (KOALA HABITAT PROTECTION) 2019

State Environmental Planning Policy – (Koala Habitat Protection) 2019 (Koala Habitat Protection SEPP) encourages the conservation and management of natural vegetation that provides habitat for Koalas. Koalas are listed under the BC Act as a vulnerable species. The Koala Habitat Protection SEPP applies to

each local government area listed in Schedule 1. The study area is located within the Maitland City Council LGA, which is listed in Schedule 1.

Key to the application of the Koala Habitat Protection SEPP is determining "core Koala habitat". Core Koala habitat means (a) an area of land where koalas are present, or (b) an area of land which has been assessed by a suitably qualified and experienced person in accordance with the Guideline as being highly suitable koala habitat, and where koalas have been recorded as being present in the previous 18 years.

As per schedule 2 of the Koala Habitat protection SEPP, Koala Tree species are listed by regions (Koala Management Areas). Under the Central Coast koala management area, 13 of the listed species were found within the study area. The Tree Specification Report (Arterra Design 2020) found 65 individual koala tree trees within the study area.

The study area is identified on the Koala Development Application Map which forms part of the Koala Habitat Protection SEPP. This map identifies areas that have highly suitable Koala habitat.

Due to the following factors, a field-based assessment for the presence of Koala and highly suitable Koala habitat was undertaken:

- A Koala Plan of Management (KPOM) does not exist for the LGA or part of the LGA in which the project is located;
- the lot size (including all adjoining lots under the same ownership or landholding) is greater than 1 ha;
- a Koala Development Application Area has been mapped on the site (includes adjoining lots in the same ownership/landholding); and
- native vegetation being cleared for the proposed development may impact Koala or Koala habitat and may impede Koala movement.

Evidence of Koala presence was not found at the proposal site, however the site does comprise high quality koala habitat due to the number of koala feed tree species. The closest record within the last 18 years is more than 2.5 km from the proposal site, therefore the proposal site does not qualify as core koala habitat and the Koala Habitat Protection SEPP does not apply.

Mitch Palmer undertook the koala habitat assessment, and is a suitably qualified and experienced person as defined by the Koala Habitat Protection SEPP.

2.8 WATER MANAGEMENT ACT 2000 (WM ACT)

The *Water Management Act 2000* (WM Act) provides for the sustainable and integrated management of the State's water for the benefit of both present and future generations. The Act controls the extraction and use of water, the construction of water bodies such as weirs and dams and any activity that is in or near water sources in NSW. The Natural Resources Access Regulator (NRAR) is responsible for the management of the state's surface water and groundwater resources.

Two Mile Creek is defined as a Second Order stream, under the Strahler classification system. As an ephemeral, lower-order stream with a small catchment, the bed and banks of the stream do not have a substantial width. Construction that is located within a 40 m prescribed distance of a waterway is considered development on Waterfront Land and requires a controlled activity approval (CAA). Part of the proposed works is within 40m of Two Mile Creek (Figure 2-1). The development is considered Integrated Development, requiring approval under Section 92 of the WM Act.

The development is required to give due consideration to the NRAR publication 'Guidelines for riparian corridors on waterfront land'. The guideline advises that some works are permitted within the Vegetated Riparian Zone (VRZ), also referred to as the Riparian Corridor. As a Second Order stream, a 20 m buffer either side of the Two Mile creek bank is recommended as the VRZ, according to Table 1 of the guidelines (Figure 2-1). The plans indicate that part of the driveway, hardstand area and pathways along the north-wester perimeter of the development would encompass a small part of the VRZ; however, an equivalent offset area is available immediately adjacent and could be connected to the VPZ.

The guidelines indicate that stormwater outlet structures and essential services are permitted in the VPZ without an offset requirement. A new stormwater outlet structure and replacement of part of an existing structure is proposed in connection with the proposed development. The design would give consideration to the NRAR publication 'Guidelines for outlet structures'.

As indicated in Section 1.1, the Maintenance Zone forms part of the Asset Protection Zone (APZ). Future vegetation management and maintenance within the Maintenance Zone (Figure 1-1) is required for bushfire hazard risk reduction, as outlined in the Two Mile Creek BFMP, though no direct impacts are proposed immediately. It is understood Council is devolving some of the adopted bushfire management actions of the Maitland Bushfire Management Plan (BFMP) (Figure 37) that relate to the adjacent public reserve to Fresh Hope Care as part of the proposed development. It is considered that the ongoing management of the bushfire fuel/risk in this reserve (Council land), where consistent with Council's BFMP, under Fresh Hope's BFMP, may be considered to be undertaken on Council's behalf. It is considered this is by way of Council retaining ownership of the reserve, Council's endorsement of the PoM and works involved, and Council's level of control over the works at any time into the future. Clause 41 of the WM (General) Regulation 2018 indicates that works undertaken on behalf of Council on waterfront land are exempt from a CAA requirement. Preliminary consultation with NRAR was undertaken; however, no firm direction could be provided at the time. NRAR would assess this element upon receipt of the development application referral from Council.

2.9 MAITLAND LOCAL ENVIRONMENTAL PLAN (LEP) 2011

This Plan aims to make local environmental planning provisions for land in Maitland in accordance with the relevant standard environmental planning instrument under section 33A of the Act.

The aims of this Plan that are relevant to this biodiversity assessment are as follows:

(a) to facilitate ecologically sustainable development of land and natural assets,

(b) to protect and maintain the extent, condition, connectivity and resilience of natural ecosystems, native vegetation, wetlands and landscapes, including those aspects of the environment that are matters of national environmental significance within Maitland in the long term,

(d) to protect, enhance or conserve the natural resources of Maitland including the following:

(i) areas of high scenic rural quality,

(ii) productive agricultural land,

(iii) habitat for listed threatened species and endangered ecological communities,

(iv) minerals of regional significance,

(i) to ensure that land uses are organised to minimise risks from hazards including flooding, bushfire, subsidence, acid sulfate soils and climate change,

(j) to encourage orderly, feasible and equitable development whilst safeguarding the community's interests, environmentally sensitive areas and residential amenity.

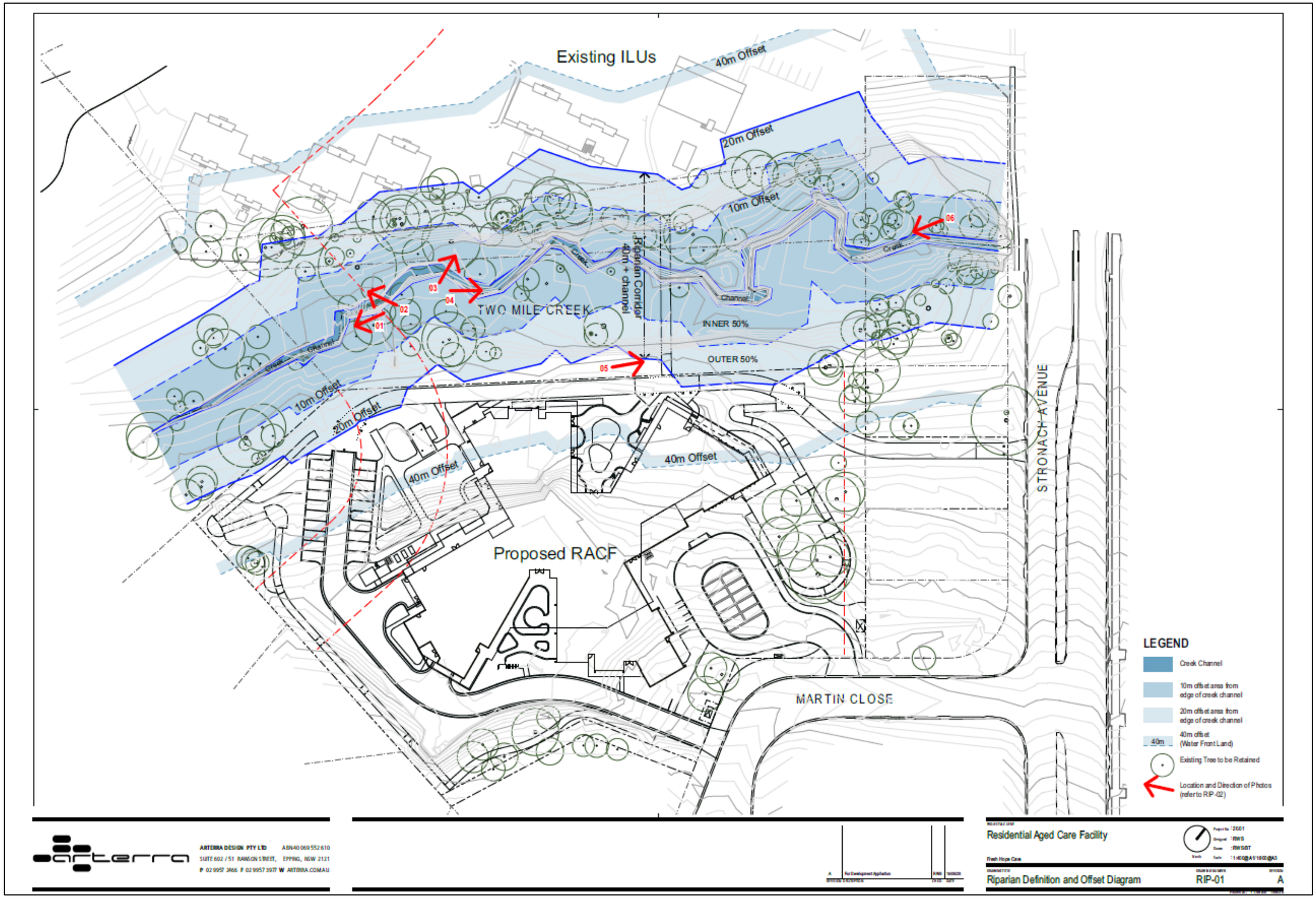

Figure 2-1 Waterfront land and Vegetated Riparian Zone (Arterra, 2020)

3 METHODOLOGY

3.1 DATABASE SEARCHES AND LITERATURE REVIEW

Background searches undertaken for the purposes of this assessment included Commonwealth and State databases to determine whether any threatened flora and fauna species, populations, ecological communities, migratory species and Areas of Outstanding Biodiversity Value (AOBVs) as detailed in State and Commonwealth legislation occur or are likely to occur within the study area. In addition to this, searches of the groundwater dependent ecosystems database and priority weeds database were also undertaken (Table 3-1).

Appendix A provides a list of threatened species that have been recorded from database searches. These species were evaluated for their potential to occur in the study area based on habitat assessments undertaken in the field. This approach assumes that if suitable habitat is present within the study area, and local records occur, the study area has potential to harbour those species. The habitat evaluation approach increases the integrity of the survey to determine presence or absence of threatened species, and reduces limitations relating to survey timing or cryptic species that are difficult to detect in surveys.

Table 3-1 Database searches for threatened species and communities, groundwater dependent ecosystems and priority weeds

Resource	Target	Search date	Search area
OEH BioNet Atlas	Threatened flora and fauna species, populations and ecological communities listed under the BC Act	31/03/20	10 km radius of the study area
EPBC Act Protected Matters Search	Threatened flora and fauna, endangered populations and ecological communities and migratory species	31/03/20	10 km radius of the study area
DPI Weed Wise	Priority weeds declared in the Hunter Region which encompasses Maitland City Council LGA.	31/03/20	Hunter region
Bureau of Meteorology National Atlas of Groundwater Dependant Ecosystems	Vegetation communities that are likely to rely on groundwater.	31/03/20	Locality
OEH vegetation information system (VIS) database and Vegetation Types Database	Plant Community Type (PCT) identification.	19/02/19	Study area

3.2 FIELD SURVEY

3.2.1 Field survey

A diurnal site assessment of the study area was undertaken on the 28th of February 2019 by an NGH ecologist. A random meander search (Cropper, 1993) was used for the field survey, to allow inspection of all available habitat types within the study area. No detailed plot data was collected. Criteria recorded during the site inspection included:

- Native flora species and vegetation communities present
- Potential of threatened species presence identified during background searches with targeted transect surveys undertaken where suitable habitat is present
- Opportunistic fauna sightings
- Weed species present and their abundance.

A follow-up survey was undertaken on 6th April 2020 to confirm previous findings and to assess 38 Stronach Avenue, which was not included in the original design.

In accordance with the Koala Habitat Protection SEPP, a field-based assessment was also undertaken to assess whether the proposal site meets the definition of 'core koala habitat'.

3.2.2 Weather conditions

Weather conditions during the field surveys are summarised in Table 3-2. Data is taken from the Maitland Airport (station 061428, BoM 2019).

Table 3-2 Weather conditions at the time of surveys

Date	Temperature Min (°C)	Temperature Max (°C)	Rain (mm)	Survey type
28/02/2019	13.9	30.5	0	Diurnal
06/04/2020	12.6	24.5	0	Diurnal
22/04/2020	10	26.3	0	Koala assessment, spotlighting
23/04/2020	7.7	24.9	0	Spotlighting

3.2.3 Flora

The objectives of the flora survey were to:

- Identify whether threatened species are present, or have the potential to occur, within the study area;
- Determine vegetation communities present within the study area, their condition and extent;
- Identify potential Threatened Ecological Communities (TECs) and determine their extent and condition, and;
- Assess the distribution and abundance of priority weeds at the study area.

An assessment and description of the vegetation communities present within the study area was undertaken with reference to the structure and condition of previous vegetation mapping (OEH 2019). Plant Community Types (PCTs) in accordance with the BioNet Vegetation Classification, were then identified via analysis of floristic data collected using the PCT Identification Tool (OEH 2019).

Within areas of suitable habitat, targeted searches for those threatened flora species, populations or ecological communities of state or national significance were undertaken. Targeted searches were undertaken for the species shown in Table 3-3.

Although a number of flora species were observed during the random meander (Appendix B), an exhaustive flora species inventory of the study area was not undertaken as surveys focused on dominant species in each stratum to determine vegetation communities present and habitat condition, and therefore likelihood of threatened species being present.

Table 3-3 Potential threatened flora species that were actively searched for

Species	Common Name	NSW Act	EPBC Act
Acacia bynoeana	Bynoe's Wattle	E	V
Callistemon linearifolius	Netted Bottle Brush	V	-
Cymbidium canaliculatum	Cymbidium canaliculatum population in the Hunter Catchment	E	-
Eucalyptus camaldulensis	Eucalyptus camaldulensis population in the Hunter catchment	E	-
Eucalyptus glaucina	Slaty Red Gum	V	V
Eucalyptus parramattensis subsp. decadens		V	V
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	V	V
Maundia triglochinoides		V	-
Rhodamnia rubescens	Scrub Turpentine	E	-
Rhodomyrtus psidioides	Native Guava	E	-
Rutidosis heterogama	Heath Wrinklewort	V	V
Syzygium paniculatum	Magenta Lilly Pilly	E	V
Tetratheca juncea	Black-eyed Susan	V	V
V = Vulnerable, E = Endangered,			

3.2.4 Fauna

Habitat Assessment

The objectives of the fauna survey were to assess the habitat present (particularly for threatened species) within the study area in relation to the presence or absence of the following attributes:

- Habitat value (leaf litter, fallen timber, ground cover extent and type)
- Condition of vegetation
- Floristic diversity of vegetation
- Nocturnal surveys for Koala and Squirrel Glider
- Presence of hollow-bearing trees
- Presence of species-specific foraging or breeding habitat.

With exception of Koala and Squirrel Glider, no targeted threatened fauna surveys were undertaken and focused on a habitat evaluation however, opportunistic fauna surveys were conducted across the study area. Detection of a variety of fauna species was limited, however, opportunistic sightings of common fauna and their traces (e.g. scats, tracks, scratches) when observed were recorded.

Core Koala Habitat Assessment

The objectives of the core koala habitat assessment were to determine koala presence within the study area and the presence of highly suitable koala habitat. In accordance with Appendix C of the Koala Habitat Protection Guideline (DPIE 2020) the following was undertaken:

- 1 x search using the Spot Assessment Technique (SAT) (Phillips and Callaghan 2011) as follows:
    - Locate and uniquely mark with flagging tape a tree (the centre tree) that meets one or more of the following selection criteria:
        - a tree of any species beneath which one or more *P. cinereus* faecal pellets have been observed and/or
        - a tree in which a *P. cinereus* has been observed and/or
        - any other tree known or considered to be potentially important for *P. cinereus*, or of interest for other assessment purposes.
    - Identify and uniquely mark the 29 nearest trees to the centre tree.
    - Undertake a search for *P. cinereus* faecal pellets beneath each of the 30 marked trees based on a cursory inspection of the undisturbed ground surface within a distance of 100 centimetres around the base of each tree, followed (if no faecal pellets are initially detected) by a more thorough inspection involving disturbance of the leaf litter and ground cover within the prescribed search area.
- Spotlighting following Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC), 2011, Survey Guidelines for Australia's Threatened Mammals, comprising:
    - At least 2 walking transects of 200 metres per 5 hectares, spaced a minimum of 100 m apart, in most likely koala habitat on site.
    - At least one transect must be placed in each PCT known to provide habitat for koalas, even if the PCT is less than 100 m wide.
    - The survey being undertaken at a walking speed of approximately 10m/ per min.
    - Searches undertaken over 2 consecutive nights.

In accordance with the Koala Habitat Protection Guideline, the number of koala feed tree species within PCT 1592 and nearby records (2.5 km from the proposal site) within the last 18 years was assessed.

3.3 LIMITATIONS

A thorough search of areas to be affected by the proposal was undertaken. As the flora field surveys were undertaken in late February in 2019 and early April in 2020, the flora species lists reflect plant species usually detectable during late summer and autumn, and therefore there is the potential for some flora species that were not in flower at the time of the survey to have gone undetected. However, the lists are considered sufficient to identify vegetation communities present within the study area and therefore to evaluate the probability of threatened flora species to occur.

Detailed habitat assessments were made within the study area, so local occurrence of fauna can be predicted. A precautionary approach has been taken as to the likelihood of the presence of threatened species so fauna species unlikely to be detected during the time of the survey are assessed.

4 RESULTS

4.1 EXISTING ENVIRONMENT

Although most native vegetation across the study area has been previously cleared or modified, areas containing remnant canopy are present adjacent to the riparian area and in scattered patches. Dominant species include Spotted Gum (*Corymbia maculata*), Red Ironbark (*Eucalyptus fibrosa*), Grey Ironbark (*E.paniculata*) and Grey Gum (*E. punctata*). Additionally, planted native vegetation occurs and are largely confined to formal garden beds with or without native canopy species including Swamp Mahogany (*E. robusta*), Tallowwood (*E. microcorys*), and River Oak (*Casuarina cunninghamiana*).

Two Mile Creek runs through council owned reserve adjacent to the development site to the north-west. The reserve consists of moderate condition vegetation including species such as Spotted Gum, Grey Gum, Forest Red Gum (*E. Tereticornis*), Tallowwood (*E. microcorys*), Turpentine (*Syncarpia glomulifera*), Red Ash (*Alphitonia excelsa*), Flax-leaved Paperbark (*Melaleuca linariifolia*), Cumbungi (*Typha australis*) and Slender Knotweed (*Persicaria decipiens*). Environmental weeds such as Paspalum (*Paspalum dilatatum*), Lantana (*Lantana camara*) and Crofton Weed (*Ageratina adenophora*) are also present.

Within cleared and landscaped areas, dominant species were predominantly exotic, non-native to NSW or naturalised including Couch (*Cynodon dactylon*), Buffalo (*Stenotaphrum sp.*) and common horticultural plantings including but not limited to Leyland cypress (*X Cupressocyparis leylandii)*, Brush Box (*Lophostemon confertus)*, Norfolk Island Hibiscus (*Lagunaria patersonia)* and Cottonwood (*Hibiscus tiliaceus)*.

4.2 FLORA

4.2.1 Plant Community Types and flora species

The site inspection identified a total of eighty-five (85) flora species within the study area including forty-seven (47) native species and thirty-eight (38) exotic species. An additional nine (9) tree species were identified by Arterra Design (2020). See Appendix B for full species list.

The study area site contains remnant components of one (1) Plant Community Type (PCT) that occurs throughout the broader locality:

- PCT 1592: Spotted Gum - Red Ironbark - Grey Gum shrub - grass open forest of the Lower Hunter.

Where exotic or non-local native species have been planted, vegetation has been mapped as urban/exotic. Descriptions of PCTs follow. Vegetation mapping of the study area is included in Figure 4-5.

Table 4-1 Identified vegetation communities

Vegetation Community	Plant Community Type (PCT)	Zone	Condition class	Threatened Ecological Community?	Area (ha) in study area
Spotted Gum - Red Ironbark - Grey Gum shrub - grass open forest of the Lower Hunter	1592	Remnant Vegetation	Good	Yes	1.63
		Remnant Canopy	Low		
		Riparian	Moderate		
Urban/exotic vegetation	-	Planted	-	No	0.08

PCT 1592: Spotted Gum - Red Ironbark - Grey Gum shrub - grass open forest of the Lower Hunter

This vegetation type is characterised by open forests dominated by Spotted Gum (*Corymbia maculata)* and Red Ironbark (*Eucalyptus fibrosa)*. The mid-storey is typically shrubby with sparse climbers and the ground storey is dominated by grasses with scattered forbs. It is mainly restricted to the lower Hunter Valley.

The canopy within the proposal site features Spotted Gum, Red Ironbark, Grey Gum, Grey Ironbark (*E.paniculata*), White Stingybark (*E.globoidea*) and Broad-leaved Mahogany (*Eucalyptus umbra*) amongst others. Although the mid and ground layers have been largely cleared, some native species are present including Blackthorn (*Bursaria spinosa)*, Coffee Bush (*Breynia oblongifolia)* and Weeping Grass (*Microlaena stipoides)*. Where riparian influence is evident, a change of plant assemblage was evident including the presence of Forest Red Gum, *Melaleuca spp.* and Red Ash and Cumbungi.

Figure 4-1 - PCT 1592 within study area (note, this is outside the proposal site)

Figure 4-2 - PCT 1592 within adjacent Council reserve

Urban/exotic vegetation

Species recorded included native species popular within a horticultural or landscaped environment including various *Callistemon spp.*, *Grevillea spp.*, Cheese tree (*Glochidion ferdinandi),* Brush Cherry (*Syzygium australe),* and commonly planted exotic species including *Murraya paniculata*, Chinese Tallow (*Sapium sebiferum)*, Cassod Tree (*Senna siamea)*, Large-leaved Privet (*Ligustrum lucidum)*, *Juniper spp.* and *Cupressus sempervirens*. Other non-NSW native species are planted throughout the site include Lemon-scented Tea-tree (*Leptospermum petersonii)*, Norfolk Island Hibiscus (*Lagunaria patersonii)* and Cadaghi gum (*Corymbia torelliana)*.

Figure 4-3 – Urban exotic vegetation within the study area

Figure 4-4 – Urban exotic vegetation within the study area (note, this is outside the development site)

Figure 4-5 Ground-truthed vegetation within the study area

4.2.2 Threatened Ecological Communities (TECs)

Searches of the NSW BioNet database and EPBC Act Protected Matters Search Tool (PMST) identified 20 TECs with potential to occur within the locality (Appendix A). PCT 1592 is associated with the BC Act listed *Lower Hunter Spotted Gum—Ironbark Forest in the Sydney Basin Bioregion TEC*. Due to the high levels of modification within the proposal site, this TEC is considered to only be present where remnant canopy species remains only and within the adjacent reserve. Potential impacts to this TEC are considered in Section 5.1.2.

4.2.1 Threatened Flora

Searches of the NSW BioNet database and EPBC Act Protected Matters Search Tool (PMST) identified 24 threatened flora species with potential to occur within the locality (Appendix A). Habitat for these species is largely limited to better condition bushland reserves within the locality. The closest record is of Native Guava (*Rhodomyrtus psidioides*) approximately 1.7 km south-east of the study area. No threatened flora species were identified during the site visit and the likelihood of occurrence is generally considered low (see Appendix C for threatened species habitat evaluations).

4.2.2 Priority Weeds

Of the 85 flora species identified in the study area, 38 species (45%) were exotic species commonly found in disturbed areas. The Biosecurity Act dictates that all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any land managers or authorities who deal with any plant has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

Four (4) priority weed listed under the Hunter Regional Strategic Weed Management Plan (HRSWMP) were recorded in the study area. These include:

Table 4-2 Identified priority weeds

Priority Weed	Duty
Fireweed *Senecio madagascariensis*	Prohibition on dealings *Must not be imported into the State or sold*
Ground asparagus *Asparagus aethiopicus*	Prohibition on dealings *Must not be imported into the State or sold*
Lantana *Lantana camara*	Prohibition on dealings *Must not be imported into the State or sold*
Willows *Salix* species	Prohibition on dealings *Must not be imported into the State or sold* All species in the *Salix* genus have this requirement, except *Salix babylonica* (weeping willows), *Salix x calodendron* (pussy willow) and *Salix x reichardtii* (sterile pussy willow)

Other exotic species recorded in the study area are common inhabitants of urban areas as landscape or horticultural plantings and within disturbed riparian corridors (See Appendix B).

4.2.3 Groundwater Dependent Ecosystems

A search of the Bureau of Meteorology's National Atlas of Groundwater Dependent Ecosystems (GDEs) found that the majority of vegetation within the study area has low potential for groundwater dependent interaction. Impacts to the riparian land within the study area is assessed below.

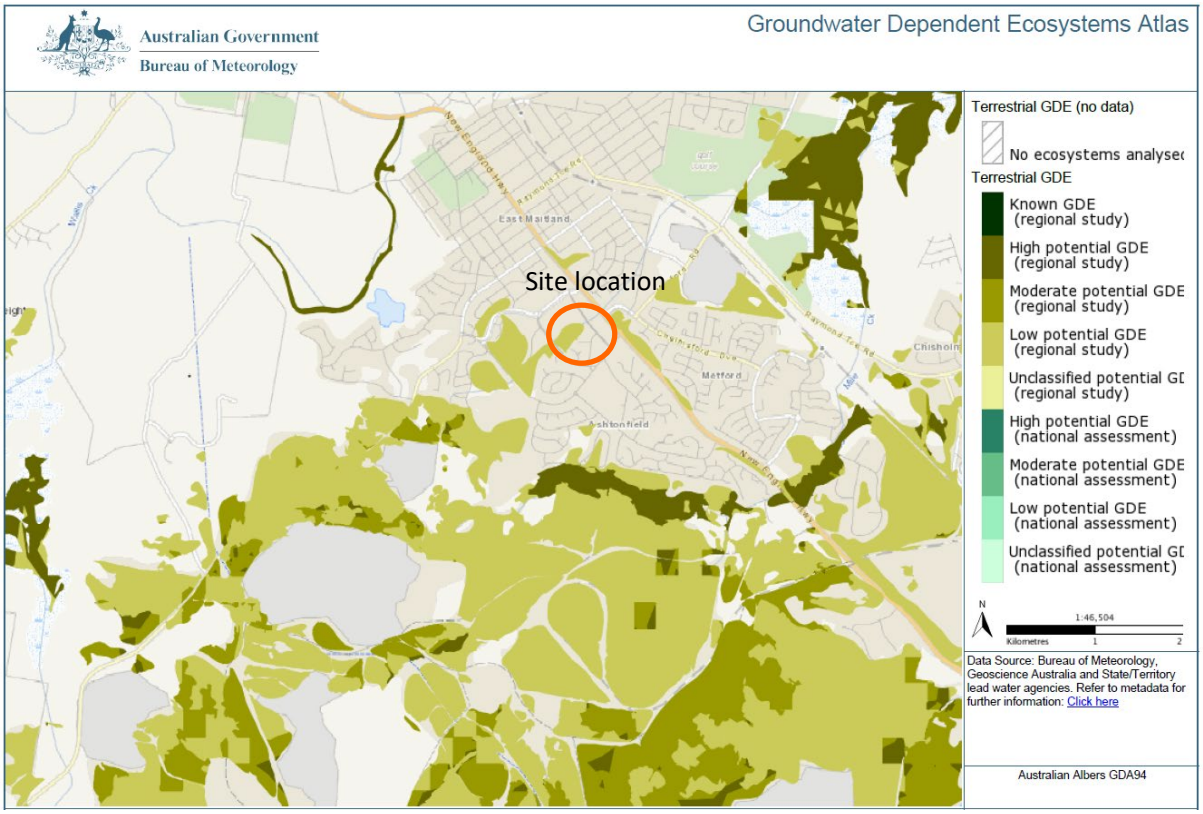

Figure 4-6 - Groundwater dependent ecosystems neighbouring study area

4.3 FAUNA

Common urban bird species were detected during diurnal surveys such as Australian Magpie *Cracticus tibicen*, Noisy Miner *Manorina melanocephala*, Kookaburra *Dacelo novaeguineae,* and Rainbow Lorikeet *Trichoglossus haematodus* (See Appendix B). A Brushtail Possum was detected during spotlighting surveys in the Council reserve to the north-west of the proposal site, as well as a Brushtail Possum scat and a likely glider (*Petaurus* spp.) scat.

4.3.1 Threatened fauna

Records within 10 km of the proposal site are predominantly of birds, microbats and arboreal mammals. There are records of Grey-Crowned Babbler (*Pomatostomus temporalis temporalis*) and Squirrel Glider (*Petaurus norfolcensis*) within vegetation to the south of Stockland Green Hills Shopping Centre from 2017 and 2018. Both species are mobile and have the potential to frequent similar vegetation along Two Mile Creek to the west of the development site. However, within the proposal site, habitat for these species is highly limited, such that impacts from vegetation removal are considered negligible. While a hollow-dependent species, Squirrel Gliders are unlikely to utilise the hollow bearing trees within the proposal site given the degree of separation from surrounding bushland. They may occasionally utilise habitat within the proposal site to forage, but they are unlikely to use the proposal site as breeding or refuge habitat.

The koala core habitat assessment found no koala scats or evidence of koalas. Sixty-five individual trees (Arterra Design 2020) from thirteen tree species that are listed in Schedule 2 of the Koala Habitat Protection SEPP were recorded within the study area, which would comprise more than 15% of the total number of trees within PCT 1592. Therefore, the site does meet the definition of highly suitable koala habitat. The site would be considered core koala habitat if there is a record within 2.5 km of the study area within the last 18 years. There are 11 records from the locality, with the most recent records in 2017 and 2018. The closest record is approximately 4.8 km from the study area, therefore it does not qualify as core koala habitat.

Generally, the treed areas of the proposal site provide limited foraging resources for birds and arboreal mammals, particularly for highly mobile and disturbance tolerant species. These resources are dwarfed by what is available in the surrounding landscape and unlikely to be utilised preferentially. Microbats may fly-over the proposal site as part of regular foraging activities.

Two (2) threatened amphibian species have records within 10 km of the proposal site, the closest being Green and Golden Bell Frog (*Litoria aurea*) approximately 2 km north-east of the proposal site. The reserve adjacent to the proposal site contains marginal habitat for Golden Bell Frog including *Typha* vegetation and a culvert, however *Typha* vegetation is dense, and the area is lacking appropriate unshaded waterbodies. However, the ephemeral and disturbed nature of the drainage line as well the few records in the locality make it unlikely that the species would be present.

Threatened species evaluations undertaken (Appendix C) for this assessment identified the Squirrel Glider as having a moderate likelihood of occurring within the study area due to the presence of a *Petaurus* spp. scat in the reserve (outside the development footprint) and recent and nearby records from 2018. As such, a Test of Significance has been completed for the Squirrel Glider (Appendix D). No other Tests of Significance (ToS) for the BC Act and/or or Assessments of Significance (AoS) have been completed for the EPBC Act listed threatened fauna.

4.4 EPBC MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

No threatened species listed under the EPBC Act are considered to be potentially impacted by the proposal. Some threatened and/or migratory (terrestrial) species may utilise habitat within the study area on occasion, however, abundant and similar habitat occurs within the locality that is likely to be utilised preferentially.

5 ASSESSMENT OF IMPACTS

5.1.1 Loss of Vegetation

The proposal will result in the clearing of up to thirty-one (31) individual trees and shrubs and the trimming of additional trees may be required (Arterra Design 2020). Of these, five (5) are local native species and nine (9) are exotic/non-NSW native species (Arterra Design 2020). It is not anticipated that any vegetation conforming to PCT 1592 will be cleared as a result of proposed works. No trees containing hollows or other significant habitat resources will be cleared as a result of proposed works.

Table 5-1 Trees to be removed or modified

Tree number	Species	Native/Non-NSW Native/Exotic
181	Small Leaved Fig *Ficus obliqua*	Native
182	Mulberry *Morus alba*	Exotic
183	Chinese Tallowwood *Sapium sebiferum*	Exotic
188	Spotted Gum *Corymbia maculata*	Native
189	Weeping Bottlebrush *Callistemon viminalis cv.*	Native
190	Weeping Bottlebrush *Callistemon viminalis cv.*	Native
197	Spotted Gum *Corymbia maculata*	Native
198	River She-oak *Casuarina cunninghamiana*	Native
199	River She-oak *Casuarina cunninghamiana*	Native
200	River She-oak *Casuarina cunninghamiana*	Native
201	Spotted Gum *Corymbia maculata*	Native
205	Black Tea Tree *Melaleuca bracteata*	Non-Local Native
206	River She-oak *Casuarina cunninghamiana*	Native
207	River She-oak *Casuarina cunninghamiana*	Native
213	Swanes Golden Pencil Pine C*upressus sempervirens 'Swanes Golden'*	Exotic
214	Swanes Golden Pencil Pine C*upressus sempervirens 'Swanes Golden'*	Exotic
215	River She-oak *Casuarina cunninghamiana*	Native
216	River She-oak *Casuarina cunninghamiana*	Native
217	River She-oak *Casuarina cunninghamiana*	Native
218	River She-oak *Casuarina cunninghamiana*	Native

Tree number	Species	Native/Non-NSW Native/Exotic
219	Fiddlewood *Citharexylum spinosum*	Exotic
220	Jacaranda *Jacaranda mimosifolia*	Exotic
221	Chinese Tallowwood *Sapium sebiferum*	Exotic
232	Chinese Elm *Ulmus parvifolia*	Exotic
233	Cadaghi *Corymbia torelliana*	Non-NSW native
234	Carob Tree *Ceratonia siliqua*	Exotic
235	Chinese Tallowwood *Sapium sebiferum*	Exotic
236	Crimson Bottlebrush *Callistemon citrinus cv.*	Native
237	Weeping Bottlebrush *Callistemon viminalis cv.*	Native
238	Coast Cotton-wood *Hibiscus tiliaceus*	Non-Local Native
240	Swanes Golden Pencil Pine *Cupressus sempervirens 'Swanes Golden'*	Exotic

5.1.2 Impacts to Two Mile Creek and riparian land

The reserve (zoned RE1) to the north-west of the development site is owned by Maitland Council. Around 2015, Maitland Council undertook extensive vegetation clearing due to flooding and bushfire concerns (Figure 5-1). Maitland Council currently continues to manage the vegetation to maintain the current density. In association with the proposed works and Development Application, Council have requested that Fresh Hope Care undertake the ongoing management of the area according to the relevant APZ guidelines. A BFMP to maintain the vegetation and fuel loads in its current status has also been prepared. As part of the current proposal, no clearing of existing vegetation within the reserve is to be undertaken, however maintenance of priority weeds, environmental weeds and midstorey vegetation to sustain the current vegetation status and densities may be required to be undertaken, as stated within the Two Mile Creek BFMP. It is considered that intermittent management of weeds and midstorey vegetation in accordance with methods prescribed in the BFMP will not have significant impacts on habitat values of the riparian land.

Figure 5-1 -Two Mile Creek reserve condition in 2012 (Source: Google Earth)

Figure 5-2 -Two Mile Creek reserve condition in 2016 following maintenance (Source: Google Earth)

Figure 5-3 -Two Mile Creek reserve to be managed in its current condition

5.1.3 Threatened Ecological Communities

Vegetation impacted by the proposal are restricted to planted native and exotic vegetation with the remnant areas of PCT 1592 avoided, therefore impacts to TECs including Lower Hunter Spotted Gum—Ironbark Forest in the Sydney Basin Bioregion EEC are considered negligible. Mitigation measures would ensure no indirect impacts should occur on any TECs within the study locality or broader region.

5.1.4 Threatened Flora

Twelve (12) threatened flora species and two threatened flora populations have records within 10 km of the proposal site (Appendix A). Habitat for these species is largely limited to better condition bushland reserves within the locality. The closest record is of Native Guava (*Rhodomyrtus psidioides*) approximately 1.7 km south-east of the study area. No threatened flora species were identified during the site visit and the likelihood of occurrence is generally considered low (see Appendix C for threatened species habitat evaluations).

5.2 FAUNA IMPACTS

5.2.1 Habitat Loss

Vegetation loss would result in a small reduction in low quality foraging habitat, mainly for commonly occurring woodland birds, reptiles and mammals. These impacts are not considered significant given the

relatively small amount of vegetation removal required, extent of exotic plant presence, historic regular site disturbance, and location adjacent to higher quality vegetation.

5.2.2 Loss of Hollow-bearing Trees and Logs

Five (5) trees with hollows or other habitat resources were observed within the study area (see Figure 4-3). None of these would be removed as a result of the proposed works. No logs were observed within the study area.

5.2.3 Threatened Fauna Species

Threatened species evaluations (Appendix C) determined that due to the presence of a likely *Petaurus* spp. scat, and a confirmed sighting nearby in 2018, the Squirrel Glider has a moderate likelihood of occurring within the study area. A ToS under the BC Act has been undertaken which concluded that given the modified nature of vegetation within the proposal area compared to higher-quality habitat along Two Mile Creek, its removal is unlikely to reduce the long-term viability of the species or accelerate its extinction. No breeding or refuge habitat would be removed, therefore the loss of approximately 0.17 ha of marginal foraging habitat is unlikely to have a significant impact on the Squirrel Glider.

The loss of habitat is unlikely to impact any other threatened fauna species as none of those highlighted as having potential to occur through database searches are considered likely to occur. The fauna habitats to be affected by the proposal generally comprise common and widespread foraging and sheltering resources, occur widely within the surrounding landscape, and are not unique to the study area. Better quality vegetation is present in significant amounts to the south, south-east and east of the study area.

No other threatened fauna species are considered to have a moderate or high likelihood of occurring within the study area due to a lack of specific foraging or roosting habitat. Potential for use as a corridor for movement is also limited given that the study area occurs within a highly modified urban landscape. No additional Tests or Assessments of Significance under the BC Act and/or EPBC Act have been prepared for threatened fauna species.

5.2.4 Injury and mortality

Although unlikely, wildlife injury or death could occur during the construction phase of the proposed works. The clearing of vegetation may result in injury or death to resident fauna. Species at risk include ground dwelling snakes, lizards, and small mammals. There is also the risk of displaced fauna succumbing to predation, or stress induced by competing with existing resident populations for resources, particularly shelter / refuge habitat.

In summary, injury and mortality of fauna could occur during construction activities, including:

- During construction, when vegetation and habitat are being cleared.
- Operation of machinery and plant.
- Construction-related traffic movements.

5.2.5 Wildlife Connectivity and Habitat Fragmentation

The proposed works would not fragment or isolate any areas of habitat, nor would they create any more barriers to movement in addition to what is already present within the locality. The study area is already

highly modified, and the proposal would not affect the connectivity of the study area to bushland in the locality.

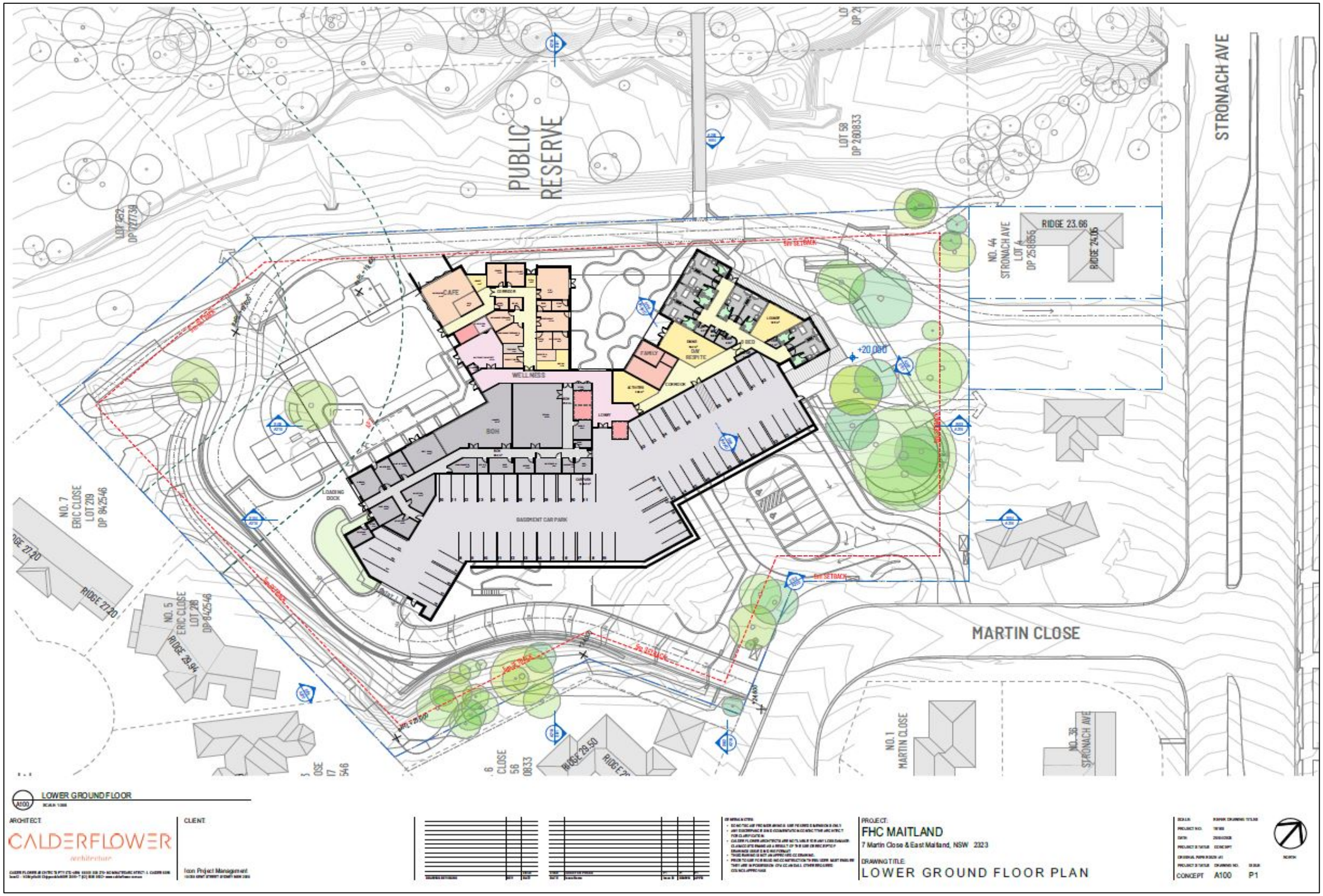

Figure 5-4 -Ground design plans associated with the proposal

5.3 IMPACTS ON RELEVANT KEY THREATENING PROCESSES

Table 5-2 Key threatening processes

Key Threatening Processes		
BC Act	**EPBC Act**	**Relevance**
Clearing of native vegetation	Land clearance	17 local native individuals would be removed under the proposal. Weed management would prevent the invasion of exotic species into disturbed areas and the associated threat to biodiversity.
Invasion, establishment and spread of *Lantana camara* and *Solanum mauritianum*	N/A	Weed management in the proposed work area would prevent contributing to this process.
Invasion of native plant communities by exotic perennial grasses	N/A	Weed management in the proposed work area would prevent contributing to this process.
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	N/A	Hygiene procedures including disinfection of vehicle tyres before entering the proposal site would be implemented to prevent contributing to the spread of chytrid.

6 MITIGATION MEASURES

6.1 AVOID AND MINIMISE

NGH was originally engaged in 2019 to provide preliminary biodiversity advice and constraints associated with the proposal based on a concept design. Upon final design, the proposal was designed to avoid and minimise vegetation clearing, where possible, and minimise potential impacts to specific habitat values that may be present at the impact area.

6.2 SAFEGUARDS AND MITIGATION MEASURES

The proposed works would use these safeguards (Table 6-1) to assist with minimising the impacts on biodiversity during construction and maintenance works.

Table 6-1 Safeguards and management measures to minimise environmental damage during the proposed works.

Impact	Environmental safeguards	Responsibility	Timing
Clearing and prevention of over-clearing	• Vegetation clearing would be limited to the area described in this BA, as a maximum clearing envelope. Detailed design would endeavour to reduce this footprint. • Prior to the commencement of any works, a physical clearing boundary is to be demarcated and implemented. Clearing would not occur outside of the area identified in this assessment. • Implement tree protection measures and protocols in accordance with Tree Protection Specifications (Arterra Design 2020). • Utilise areas already impacted by previous clearing or disturbance as far as practicable during design and construction or the establishment of a compound site.	Proponent and contractor	Pre-construction and construction
APZ maintenance	• APZ maintenance within the Maintenance Zone to be in accordance with methods approved within Two Mile Creek BFMP	Proponent and contractor	Pre-construction, construction and post construction
Direct impact to threatened fauna	• An unexpected threatened species finds procedure will be developed prior to commencement of clearing, with detail included in site inductions and toolbox talks as to potential species encountered, and actions to be taken when encountered	Proponent and contractor	Pre-construction and construction

Impact	Environmental safeguards	Responsibility	Timing
Direct impact to threatened flora	• An unexpected threatened species finds procedure will be developed prior to commencement of clearing, with detail included in site inductions and toolbox talks as to potential species encountered, and actions to be taken when encountered	Proponent and contractor	Pre-construction and construction
Fauna mortality during clearing	• Clearing would be supervised by a suitable qualified ecologist who would relocate any fauna found within the clearing area and arrange for relocation or care for injured fauna if required	Proponent and contractor	Pre-construction and construction
Accidental spills and contamination from construction activities (including compound sites)	• Ensure that wet and dry spill kits are readily available on site • Refuelling of equipment and vehicles would occur within a bunded area outside of the VRZ of Two Mile Creek	Proponent and contractor	Pre-construction and construction
Erosion and sedimentation	• Erosion and Sediment Control Plan to include measures to minimise potential direct and indirect impacts to biodiversity and riparian values surrounding the proposal site	Proponent and contractor	Pre-construction and construction
Noise	• The Construction Environmental Management Plan will include measures to avoid noise encroachment on adjacent vegetation such as work timing during daylight hours	Proponent and contractor	Pre-construction and construction
Dust	• The Construction Environmental Management Plan will include measures to prevent dust spreading to nearby habitats	Proponent and contractor	Pre-construction and construction
Light spill during operation	• Avoid nightworks • If night work is unavoidable, ensure any floodlights are directed away from vegetation where possible.	Proponent and contractor	Pre-construction and construction
Introduction and spread of priority weeds and pathogens	• Priority weeds within the proposal site would be treated prior to construction with methods and agents suitable for use near waterways • A Weed Management Plan will be developed for the site to prevent/minimise the spread of weeds during construction	Proponent and contractor	Pre-construction and construction

Impact	Environmental safeguards	Responsibility	Timing
	• Construction machinery will be cleaned using a high-pressure washer (or other suitable device) prior to entering work site		
Disturbance to woody debris and litter	• If relevant, all coarse woody debris is to be retained on site where possible or relocated to any area outside of the proposed works area for future habitat	Proponent and contractor	Pre-construction and construction

7 CONCLUSION

The proposal will result in the clearing of up to thirty-one (31) native, non-NSW and exotic trees and shrubs within a high modified landscaped area. Additionally, trimming of vegetation may be required. It is not anticipated that any remnant vegetation conforming to PCT 1592 will be cleared as a result of proposed works. No trees containing hollows or other significant habitat resources will be cleared as a result of proposed works.

The proposal will not trigger entry into the Biodiversity Offsets Scheme as it will result in the removal of up to 0.17 ha of native vegetation, thus not exceeding the clearing threshold of 0.25 ha. The proposal site is not mapped on the Biodiversity Values Map.

Due to the presence of a likely Petaurus spp. scat and nearby records, there is the potential for Squirrel Gliders (BC-V) to occur within the study area. A Test of Significance concluded that the removal of marginal habitat from the proposal site is unlikely to reduce the long-term viability of the species or accelerate its rate of extinction. No other threatened flora or fauna were recorded during the field survey, and no other threatened species are considered to have a moderate or high likelihood of occurring within the study area. One (1) TEC was observed to occur within the study area but would not be directly impacted, with mitigation measures implemented to ensure no indirect impacts. No Assessments of Significance were completed as potential impacts to threatened entities listed under the EPBC Act are considered negligible.

Future maintenance works of reducing weeds and regrowth of mid storey species within the APZ Maintenance Zone may be required to maintain current vegetation densities and compliance with APZ requirement stated within the Two Mile Creek Bushfire Plan of Management. No direct clearing impacts are currently planned to occur as part of the Development Application within this area.

With the implementation of the mitigation measures detailed in this Biodiversity Assessment, the risk of impacts to biodiversity under this proposal is considered negligible.

8 REFERENCES

Arterra Design Pty Ltd (2020). Tree Protection Specifications.

Bureau of Meteorology (2019). Weather Observations for Maitland Airport, accessed 01/05/19.

Bureau of Meteorology (2020). Weather Observations for Maitland Airport, accessed 27/04/20.

Cropper, S.C. (1993) *Management of Endangered Plants*. CSIRO Australia, Melbourne.

Department of Environment and Conservation (DEC) (2004). Nectar Food Trees. Natural Resource Management Advisory Series: NOTE 4.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) 2011. Survey Guidelines for Australia's Threatened Mammals.

EPM Planning (2018). *East Maitland Planning Report – Revision F*, North Sydney.

Ian Hills, *Preliminary Arboricultural Assessment* (2019).

Office of Environment and Heritage (2019) New South Wales BioNet Wildlife Atlas, https://www.environment.nsw.gov.au/AtlasApp/Default.aspx?a=1.

Phillips, S. & Callaghan, J. (2011). The Spot Assessment Technique: a tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus. *Australian Zoologist, 35*(3), 774-780.

Planning Report (EPM 2018)

Sivertsen, D., Roff, A., Somerville, M., Thonell, J., and Denholm, B. (2011). *Hunter Native Vegetation Mapping*. Geodatabase Guide (Version 4.0), Internal Report for the Office of Environment and Heritage, Department of Premier and Cabinet, Sydney, Australia.

Maitland Local Environmental Plan (2011). Published 16 December 2011.

APPENDIX A DATABASE SEARCHES

A.1 NSW BIONET SEARCH

Data from the BioNet BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1Â°; ^^ rounded to 0.01Â°). Copyright the State of NSW through the Office of Environment and Heritage. Search criteria : Licensed Report of all Valid Records of Threatened (listed on TSC Act 1995) or Commonwealth listed Entities in MAITLAND LGA returned a total of 855 records of 194 species.

Report generated on 2/04/2020 9:25 AM

Kingdom	Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Animalia	Amphibia	Hylidae	*Litoria aurea*	Green and Golden Bell Frog	E1,P	V	8
Animalia	Amphibia	Hylidae	*Litoria littlejohni*	Littlejohn's Tree Frog	V,P	V	1
Animalia	Aves	Anseranatidae	*Anseranas semipalmata*	Magpie Goose	V,P		1
Animalia	Aves	Meliphagidae	*Anthochaera phrygia*	Regent Honeyeater	E4A,P	CE	1
Animalia	Aves	Artamidae	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		2
Animalia	Aves	Cacatuidae	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	V,P,2		1
Animalia	Aves	Acanthizidae	*Chthonicola sagittata*	Speckled Warbler	V,P		4
Animalia	Aves	Accipitridae	*Circus assimilis*	Spotted Harrier	V,P		3
Animalia	Aves	Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	V,P		6
Animalia	Aves	Ciconiidae	*Ephippiorhynchus asiaticus*	Black-necked Stork	E1,P		40
Animalia	Aves	Meliphagidae	*Epthianura albifrons*	White-fronted Chat	V,P		1
Animalia	Aves	Psittacidae	*Glossopsitta pusilla*	Little Lorikeet	V,P		21
Animalia	Aves	Accipitridae	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V,P	C	17
Animalia	Aves	Accipitridae	*Hamirostra melanosternon*	Black-breasted Buzzard	V,P,3		1
Animalia	Aves	Psittacidae	*Lathamus discolor*	Swift Parrot	E1,P,3	CE	3
Animalia	Aves	Meliphagidae	*Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern subspecies)	V,P		1

Animalia	Aves	Psittacidae	*Neophema pulchella*	Turquoise Parrot	V,P,3		K
Animalia	Aves	Strigidae	*Ninox connivens*	Barking Owl	V,P,3		3
Animalia	Aves	Strigidae	*Ninox strenua*	Powerful Owl	V,P,3		8
Animalia	Aves	Anatidae	*Oxyura australis*	Blue-billed Duck	V,P		5
Animalia	Aves	Accipitridae	*Pandion cristatus*	Eastern Osprey	V,P,3		3
Animalia	Aves	Petroicidae	*Petroica boodang*	Scarlet Robin	V,P		1
Animalia	Aves	Pomatostomidae	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)	V,P		54
Animalia	Aves	Columbidae	*Ptilinopus regina*	Rose-crowned Fruit-Dove	V,P		1
Animalia	Aves	Rostratulidae	*Rostratula australis*	Australian Painted Snipe	E1,P	E	1
Animalia	Aves	Laridae	*Sternula albifrons*	Little Tern	E1,P	C,J,K	1
Animalia	Aves	Anatidae	*Stictonetta naevosa*	Freckled Duck	V,P		4
Animalia	Aves	Tytonidae	*Tyto novaehollandiae*	Masked Owl	V,P,3		10
Animalia	Mammalia	Vespertilionidae	*Chalinolobus dwyeri*	Large-eared Pied Bat	V,P	V	2
Animalia	Mammalia	Dasyuridae	*Dasyurus maculatus*	Spotted-tailed Quoll	V,P	E	10
Animalia	Mammalia	Vespertilionidae	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V,P		27
Animalia	Mammalia	Molossidae	*Micronomus norfolkensis*	Eastern Coastal Free-tailed Bat	V,P		57
Animalia	Mammalia	Miniopteridae	*Miniopterus australis*	Little Bent-winged Bat	V,P		73
Animalia	Mammalia	Miniopteridae	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P		58
Animalia	Mammalia	Vespertilionidae	*Myotis macropus*	Southern Myotis	V,P		28
Animalia	Mammalia	Pseudocheiridae	*Petauroides volans*	Greater Glider	P	V	2
Animalia	Mammalia	Petauridae	*Petaurus norfolcensis*	Squirrel Glider	V,P		46
Animalia	Mammalia	Dasyuridae	*Phascogale tapoatafa*	Brush-tailed Phascogale	V,P		15
Animalia	Mammalia	Phascolarctidae	*Phascolarctos cinereus*	Koala	V,P	V	11

Animalia	Mammalia	Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	245
Animalia	Mammalia	Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		8
Animalia	Mammalia	Vespertilionidae	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P		30
Animalia	Mammalia	Vespertilionidae	*Vespadelus troughtoni*	Eastern Cave Bat	V,P		5
Animalia	Reptilia	Cheloniidae	*Caretta caretta*	Loggerhead Turtle	E1,P	E	1
Plantae	Flora	Fabaceae (Mimosoideae)	*Acacia bynoeana*	Bynoe's Wattle	E1	V	1
Plantae	Flora	Myrtaceae	*Callistemon linearifolius*	Netted Bottle Brush	V,3		2
Plantae	Flora	Orchidaceae	*Cymbidium canaliculatum*	Cymbidium canaliculatum population in the Hunter Catchment	E2,P,2		3
Plantae	Flora	Myrtaceae	*Eucalyptus camaldulensis*	Eucalyptus camaldulensis population in the Hunter catchment	E2		6
Plantae	Flora	Myrtaceae	*Eucalyptus glaucina*	Slaty Red Gum	V	V	7
Plantae	Flora	Myrtaceae	*Eucalyptus parramattensis subsp. decadens*		V	V	1
Plantae	Flora	Proteaceae	*Grevillea parviflora subsp. parviflora*	Small-flower Grevillea	V	V	1
Plantae	Flora	Juncaginaceae	*Maundia triglochinoides*		V		1
Plantae	Flora	Proteaceae	*Persoonia pauciflora*	North Rothbury Persoonia	E4A,P,3	CE	1
Plantae	Flora	Orchidaceae	*Pterostylis gibbosa*	Illawarra Greenhood	E1,P,2	E	1
Plantae	Flora	Myrtaceae	*Rhodamnia rubescens*	Scrub Turpentine	E4A		2
Plantae	Flora	Myrtaceae	*Rhodomyrtus psidioides*	Native Guava	E4A		5
Plantae	Flora	Asteraceae	*Rutidosis heterogama*	Heath Wrinklewort	V	V	2
Plantae	Flora	Myrtaceae	*Syzygium paniculatum*	Magenta Lilly Pilly	E1	V	2
Community			*Central Hunter Grey Box Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions*		E3	CE	K

Community	*Central Hunter Ironbark Spotted Gum Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions*	E3	CE	K
Community	*Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	E3	V	P
Community	*Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	E3		K
Community	*Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions*	E3		K
Community	*Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions*	E3		K
Community	*Hunter Valley Footslopes Slaty Gum Woodland in the Sydney Basin Bioregion*	V2	CE	K
Community	*Hunter Valley Vine Thicket in the NSW North Coast and Sydney Basin Bioregions*	E3		K
Community	*Hunter Valley Weeping Myall Woodland in the Sydney Basin Bioregion*	E4B	CE	K
Community	*Kurri Sand Swamp Woodland in the Sydney Basin Bioregion*	E3		K
Community	*Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	E3	CE	P
Community	*Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions*	E3		K
Community	*Lower Hunter Valley Dry Rainforest in the Sydney Basin and NSW North Coast Bioregions*	V2		K
Community	*Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions*	E3	CE	K
Community	*River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	E3		K
Community	*Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	E3	E	K
Community	*Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	E3		K

Community	*Sydney Freshwater Wetlands in the Sydney Basin Bioregion*	E3		K
Community	*Warkworth Sands Woodland in the Sydney Basin Bioregion*	E3	CE	K
Community	*White Box Yellow Box Blakelys Red Gum Woodland*	E3	CE	K

A.2 EPBC ACT PROTECTED MATTERS SEARCH TOOL

Australian Government
Department of the Environment and Energy

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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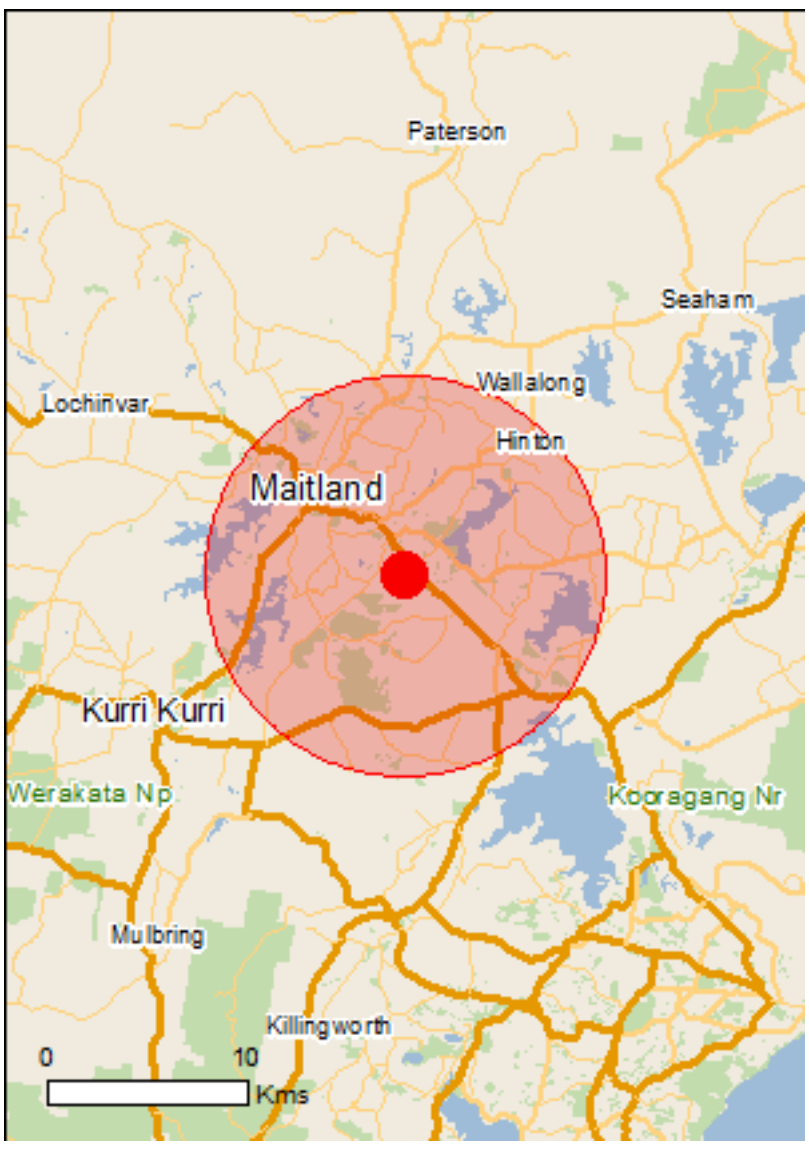

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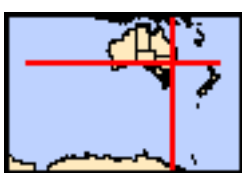

Summary

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:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	49
Listed Migratory Species:	32

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:	8
Commonwealth Heritage Places:	1
Listed Marine Species:	43
Whales and Other Cetaceans:	None
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:	1
Regional Forest Agreements:	1
Invasive Species:	45
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Hunter estuary wetlands	Within 10km of Ramsar

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
Central Hunter Valley eucalypt forest and woodland	Critically Endangered	Community may occur within area
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 may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat may 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 known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known 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 known to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat may occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat may occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Litoria littlejohni Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat may occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mixophyes iteratus Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat likely to occur within area
Insects		
Synemon plana Golden Sun Moth [25234]	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 known to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Acacia bynoeana		
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat known to occur within area
Caladenia tessellata		
Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat may occur within area
Cryptostylis hunteriana		
Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area
Cynanchum elegans		
White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Dichanthium setosum		
bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus glaucina		
Slaty Red Gum [5670]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus parramattensis subsp. decadens		
Earp's Gum, Earp's Dirty Gum [56148]	Vulnerable	Species or species habitat known to occur within area
Euphrasia arguta		
[4325]	Critically Endangered	Species or species habitat may occur within area
Grevillea parviflora subsp. parviflora		
Small-flower Grevillea [64910]	Vulnerable	Species or species habitat known to occur within area
Melaleuca biconvexa		
Biconvex Paperbark [5583]	Vulnerable	Species or species habitat may occur within area
Persicaria elatior		
Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area
Prasophyllum sp. Wybong (C.Phelps ORG 5269)		
a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area
Pterostylis gibbosa		
Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Rutidosis heterogama		
Heath Wrinklewort [13132]	Vulnerable	Species or species habitat known to occur within area
Syzygium paniculatum		
Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat likely to occur within area
Tetratheca juncea		
Black-eyed Susan [21407]	Vulnerable	Species or species habitat known to occur within area
Thesium australe		
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Delma impar		
Striped Legless Lizard, Striped Snake-lizard [1649]	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		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to 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 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 known to 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
Arenaria interpres		
Ruddy Turnstone [872]		Species or species habitat known to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area
Pluvialis squatarola Grey Plover [865]		Species or species habitat known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis		
Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area
Xenus cinereus		
Terek Sandpiper [59300]		Species or species habitat known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Commonwealth Land -
Commonwealth Land - Airservices Australia
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Defence Housing Authority
Commonwealth Land - Director of Defence Service Homes
Commonwealth Land - Director of War Service Homes
Defence - SCOBIE BARRACKS ; 2/17 RNSWR RUTHERFORD ; RUTHERFORD GRES DEPOT

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		
Maitland Post Office	NSW	Listed place

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
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres		
Ruddy Turnstone [872]		Species or species habitat known to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Species or species habitat known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		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 known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
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 known to 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 known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known 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
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area
Pluvialis squatarola Grey Plover [865]		Species or species habitat known to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known 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 known 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 known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Xenus cinereus		
Terek Sandpiper [59300]		Species or species habitat known to occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Pambalong	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 Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		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
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur

Name	Status	Type of Presence
		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 habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		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
Feral deer Feral deer species in Australia [85733]		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
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

Name	Status	Type of Presence
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		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
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
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		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 monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may 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
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		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

Name	Status	Type of Presence
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area

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

-32.76673 151.59335

Acknowledgements

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

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

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

Please feel free to provide feedback via the Contact Us page.

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Priority weeds for the Hunter

Note: this region includes the local council areas of Cessnock, Dungog, Lake Macquarie, Maitland, Mid-Coast, Muswellbrook, Newcastle, Port Stephens, Singleton and Upper Hunter.

Select another region

Weed	Duty
All plants	**General Biosecurity Duty** *All plants are regulated with a **general biosecurity duty** to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.*
African boxthorn *Lycium ferocissimum*	**Prohibition on dealings** *Must not be imported into the State or sold*
African olive *Olea europaea* subsp. *cuspidata*	**Regional Recommended Measure** *Land managers mitigate the risk of the plant being introduced to their land. Land managers reduce impacts from the plant on priority assets. Land managers prevent spread from their land where feasible. The plant or parts of the plant are not traded, carried, grown or released into the environment*
Alligator weed *Alternanthera philoxeroides*	**Prohibition on dealings** *Must not be imported into the State or sold*
Alligator weed *Alternanthera philoxeroides*	**Biosecurity Zone** The Alligator Weed Biosecurity Zone is established for all land within the state except land in the following regions: Greater Sydney; Hunter (but only in the local government areas of City of Lake Macquarie, City of Maitland, City of Newcastle or Port Stephens). *Within the Biosecurity Zone this weed must be eradicated where practicable, or as much of the weed destroyed as practicable, and any remaining weed suppressed. The local control authority must be notified of any new infestations of this weed within the Biosecurity Zone*
Anchored water hyacinth	**Prohibited Matter**

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APPENDIX B FLORA AND FAUNA SITE LISTS

B.1 FLORA SPECIES

^ identified by Arterra Design (2020)

Scientific Name	Common Name	Family	Exotic
Acacia irrorata	Green Wattle	Fabaceae (Mimosoideae)	
Agapanthus spp.		Alliaceae	*
Agave spp.		Agavaceae	*
Ageratina adenophora	Crofton Weed	Asteraceae	*
Alphitonia excelsa	Red Ash	Rhamnaceae	
Arundinella nepalensis	Reedgrass	Poaceae	
Asparagus aethiopicus	Asparagus Fern	Asparagaceae	*
Banksia integrifolia	Coast Banksia	Proteaceae	
Bidens pilosa	Cobbler's Pegs	Asteraceae	*
Breynia oblongifolia	Coffee Bush	Phyllanthaceae	
Bursaria spinosa	Native Blackthorn	Pittosporaceae	
Callistemon citrinus	Crimson Bottlebrush	Myrtaceae	
Callistemon salignus	Willow Bottlebrush	Myrtaceae	
Callistemon spp.		Myrtaceae	
Callistemon viminalis	Weeping Bottlebrush	Myrtaceae	
Carex appressa	Tall Sedge	Cyperaceae	
Casuarina cunninghamiana subsp. cunninghamiana	River Oak	Casuarinaceae	
Ceratonia siliqua	Carob	Fabaceae (Caesalpinioideae)	*
Chloris gayana	Rhodes Grass	Poaceae	*
Cinnamomum camphora	Camphor Laurel	Lauraceae	*
*Citharexylum spinosum^*	Fiddlewood	Verbenaceae	*
Conyza bonariensis	Flaxleaf Fleabane	Asteraceae	*

Scientific Name	Common Name	Family	Exotic
*Corymbia citriodora^*	Lemon Scented Gum	Myrtaceae	
Corymbia maculata	Spotted Gum	Myrtaceae	
Corymbia torelliana	Cadaghi	Myrtaceae	*
Cupressus sempervirens 'Swanes Golden'^	Swanes Golden Pencil Pine	Cupressaceae	*
Cynodon spp.		Poaceae	*
Desmodium varians	Slender Tick-trefoil	Fabaceae (Faboideae)	
Dietes vegeta		Iridaceae	*
Duranta erecta	Sky Flower	Verbenaceae	*
Eucalyptus acmenoides	White Mahogany	Myrtaceae	
Eucalyptus fibrosa	Red Ironbark	Myrtaceae	
Eucalyptus globoidea	White Stringybark	Myrtaceae	
Eucalyptus microcorys	Tallowwood	Myrtaceae	
*Eucalyptus nicholii^*	Narrow-leaved Black Peppermint	Myrtaceae	
Eucalyptus paniculata	Grey Ironbark	Myrtaceae	
Eucalyptus punctata	Grey Gum	Myrtaceae	
Eucalyptus robusta	Swamp Mahogany	Myrtaceae	
Eucalyptus sieberi	Silvertop Ash	Myrtaceae	
Eucalyptus tereticornis	Forest Red Gum	Myrtaceae	
Eucalyptus umbra	Broad-leaved White Mahogany	Myrtaceae	
Ficus obliqua	Small-leaved Fig	Moraceae	
Geitonoplesium cymosum	Scrambling Lily	Luzuriagaceae	
Geranium spp.		Geraniaceae	*
Glochidion ferdinandi	Cheese Tree	Phyllanthaceae	
Glycine clandestina	Twining glycine	Fabaceae (Faboideae)	
Grevillea spp.		Proteaceae	
Hibiscus tiliaceus	Cottonwood Hibiscus	Malvaceae	

Scientific Name	Common Name	Family	Exotic
Hymenosporum flavum	Native Frangipani	Pittosporaceae	
Jacaranda mimosifolia	Jacaranda	Bignoniaceae	*
Juncus cognatus		Juncaceae	*
Lagunaria patersonii	Norfolk Island Hibiscus	Malvaceae	
Lantana camara	Lantana	Verbenaceae	*
Leptospermum petersonii	Lemon-scented Teatree	Myrtaceae	
Ligustrum lucidum	Large-leaved Privet	Oleaceae	*
Lomandra longifolia	Spiny-headed Mat-rush	Lomandraceae	
Lophostemon confertus	Brush Box	Myrtaceae	
Magnolia spp.		Magnoliaceae	*
*Melaleuca bracteata^*	Black Tea-Tree	Myrtaceae	
Melaleuca linariifolia	Flax-leaved Paperbark	Myrtaceae	
Melaleuca nodosa		Myrtaceae	
Melaleuca quinquenervia	Broad-leaved Paperbark	Myrtaceae	
Melaleuca styphelioides	Prickly-leaved Tea Tree	Myrtaceae	
Microlaena stipoides	Weeping Grass	Poaceae	
*Morus nigra^*	Mulberry	Moraceae	*
Murraya paniculata		Rutaceae	*
Parsonsia straminea	Common Silkpod	Apocynaceae	
Paspalum dilatatum	Paspalum	Poaceae	*
Pennisetum clandestinum	Kikuyu Grass	Poaceae	*
Persicaria decipiens	Slender Knotweed	Polygonaceae	
Phyllanthus hirtellus	Thyme Spurge	Phyllanthaceae	
Plantago lanceolata	Lamb's Tongues	Plantaginaceae	*
Plumeria rubra	Frangipani	Apocynaceae	*
Pratia purpurascens	Whiteroot	Lobeliaceae	

Scientific Name	Common Name	Family	Exotic
Rosa spp.		Rosaceae	*
Salix spp.		Salicaceae	*
*Sapium sebiferum^*	Chinese Tallow	Euphorbiaceae	*
Schefflera actinophylla	Umbrella Tree	Araliaceae	*
Senecio madagascariensis	Fireweed	Asteraceae	*
Senna pendula var. glabrata		Fabaceae (Caesalpinioideae)	*
*Senna siamea^*	Cassod Tree	Fabaceae (Caesalpinioideae)	*
Setaria parviflora		Poaceae	*
Sida rhombifolia	Paddy's Lucerne	Malvaceae	*
Stenotaphrum secundatum	Buffalo Grass	Poaceae	*
*Syagrus romanzoffiana^*	Queen Palm	Arecaceae	*
Syncarpia glomulifera	Turpentine	Myrtaceae	
Syzygium australe	Brush Cherry	Myrtaceae	
Themeda triandra		Poaceae	
Typha australis		Typhaceae	*
Ulmus parvifolia	Chinese Elm	Ulmaceae	*
Verbena bonariensis	Purpletop	Verbenaceae	*
X Cupressocyparis leylandii		Cupressaceae	*

FAUNA SPECIES RECORDED

Scientific Name	Common Name
BIRDS	
Caligavis chrysops	Yellow-faced Honeyeater
Cracticus tibicen	Australian Magpie
Dacelo novaeguineae	Kookaburra
Grallina cyanoleuca	Magpie-lark
Manorina melanocephala	Noisy Miner
Platycercus eximius	Eastern Rosella
Rhipidura leucophrys	Willie Wagtail
Trichoglossus haematodus	Rainbow Lorikeet
MAMMALS	
Trichosurus vulpecula	Common Brushtail Possum
***Petaurus* spp.** (scat)	Glider species

APPENDIX C THREATENED SPECIES EVALUATIONS

The tables in this appendix present the habitat evaluation for threatened species, ecological communities and endangered populations listed for the locality in the *NSW BioNet Database*[1] and those identified as potentially occurring in the area according to the Commonwealth EPBC *Protected Matters Search Tool*[2].

The likelihood of occurrence is based on presence of habitat, proximity of nearest records and mobility of the species (where relevant). The assessment of potential impact is based on the nature of the proposal, the ecology of the species and its likelihood of occurrence. The following classifications are used:

Presence of habitat:

Present: Potential or known habitat is present within the study area.

Marginal: Habitat present that could be used by the species on occasion but not preferred.

Absent: No potential or known habitat is present within the study area.

Likelihood of occurrence

Recorded: The species was observed in the study area during the current survey

High: It is highly likely that a species inhabits the study area and is dependent on identified suitable habitat (i.e. for breeding or important life cycle periods such as winter flowering resources), has been recorded recently in the locality (10km) and is known or likely to maintain resident populations in the study area. Also includes species known or likely to visit the study area during regular seasonal movements or migration.

Moderate: Potential habitat is present in the study area. Species Low to maintain sedentary populations, however, may seasonally use resources within the study area opportunistically or during migration. The species is Low to be dependent (i.e.. for breeding or important life cycle periods such as winter flowering resources) on habitat within the study area, or habitat is in a modified or degraded state. Includes cryptic flowering flora species that were not seasonally targeted by surveys and that have not been recorded.

Low: It is unlikely that the species inhabits the study area and has not been recorded recently in the locality (10km). It may be an occasional visitor, but habitat similar to the study area is widely distributed in the local area, meaning that the species is not dependent (i.e.. for breeding or important life cycle periods such as winter flowering resources) on available habitat. Specific habitat is not present in the study area or the species are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded.

Potential to be impacted

Low: The proposal would not impact this species or its habitats. No Test of Significance (ToS) is necessary for this species.

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[1] *BioNet* is administered by the NSW Office of Environment& Heritage (OEH) and is an online database of fauna and flora records that contains over four million recorded sightings.

[2] This online tool is designed for the public to search for matters protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It is managed by the Commonwealth Department of the Environment and Energy.

Moderate: The proposal could impact this species or its habitats however the impacts are considered manageable such that no direct or indirect impacts are likely. No Test of Significance (ToS) is necessary for this species.

High: The proposal is likely to impact this species or its habitats. A ToS has been applied to these entities.

C.1 EVALUATION OF THE LIKELIHOOD AND EXTENT OF IMPACT ON THREATENED FLORA AND TECS

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

K = Known, P = Predicted

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
Flora							
Acacia bynoeana Bynoe's Wattle	E	V	This species is confined to the northern portion of the Sydney Basin Bioregion and the southern portion of the north coast Bioregion. Occurs in heath or dry sclerophyll forest on sandy clay soils, often containing ironstone gravels. Seems to prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. Bynoe's Wattle is a semi-prostrate shrub to a metre high. The single flower heads, on short hairy stems, appear anytime from September to March. Its seedpods are mature from September to January. The hairy branchlets distinguish the species from the similar and more common Three-veined Wattle *Acacia trinervata*. It is more likely to occur in sclerophyllous heath or woodland on Sandstone based substrates in association with *Corymbia gummifera*, *Eucalyptus sclerophylla*, *Banksia serrata* & *Angophora bakeri*, none of which occur in Cumberland Plain Woodland. It has been recorded in Castlereagh Nature Reserve.	1	Marginal	Low	Low
Caladenia tessellata Thick Lip Spider Orchid	E	V	The Thick Lip Spider Orchid is known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW. Populations in Kiama and Queanbeyan are presumed extinct. It was also recorded in the Huskisson area in the 1930s. The species occurs on the coast in Victoria from east of Melbourne to almost the NSW border. Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. The single leaf regrows each year. Flowers appear between September and November (but apparently generally late September or early October in extant southern populations).	0	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
Callistemon linearifolius Netted Bottle Brush	V	-	A shrub up to 3-4m tall. Recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW. Recorded in 2000 at Coal Cliffs in the Southern Rivers CMA. For the Sydney area, recent records are limited to the Hornsby Plateau area near the Hawkesbury River. Was more widespread across its distribution in the past. There are currently only 5-6 populations in the Sydney area, of the 22 populations recorded in the past. Three of these are reserved in Ku-ring-gai Chase National Park, Lion Island Nature Reserve, and Spectacle Island Nature Reserve. Further north it has been recorded from Yengo National Park. Grows in dry sclerophyll forest on the coast and adjacent ranges. Flowers spring to summer.	2	Marginal	Low	Low
Cryptostylis hunteriana Leafless Tongue-orchid	V	V	The Leafless Tongue Orchid has been recorded from as far north as Gibraltar Range National Park south into Victoria around the coast as far as Orbost. It is known historically from a number of localities on the NSW south coast and has been observed in recent years at many sites between Batemans Bay and Nowra (although it is uncommon at all sites). Also recorded at Munmorah State Conservation Area, Nelson Bay, Wyee, Washpool National Park, Nowendoc State Forest, Ku-Ring-Gai Chase National Park and Ben Boyd National Park. Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by Scribbly Gum (*Eucalyptus sclerophylla*), Silvertop Ash (*E. sieberi*), Red Bloodwood (*Corymbia gummifera*) and Black Sheoak (*Allocasuarina littoralis*); appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (*C. subulata*) and the Tartan Tongue Orchid (*C. erecta*). Little is known about the ecology of the species; being leafless it is expected to have limited photosynthetic capability and probably depends upon a fungal associate to meet its nutritional requirements from either living or dead organic material. In addition to reproducing from seed, it is also	0	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			capable of vegetative reproduction and thus forms colonies which can become more or less permanent at a site.				
Cymbidium canaliculatum - endangered population Cymbidium canaliculatum population in the Hunter Catchment	E	-	A disjunct population of fewer than 500 individuals though estimated to be as low as 90, which occurs in the Hunter Valley at the south-eastern distributional limit of the species' range. The Hunter population is known to occur naturally as far south as Weston and Pokolbin in the Lower Hunter, which represents its south-eastern geographic limit, but appears to be more centred in the Upper Hunter, predominantly north of Singleton. In this area it is chiefly known from an area bounded by Ravensworth, Muswellbrook, Denman and Sandy Hollow, but extends northwards to the Aberdeen – Scone – Wingen districts. Isolated occurrences are also known from the Merriwa plateau, Bylong valley and the Gungal area near Goulburn River (including the Goulburn River National Park). Nevertheless, the population is defined as occurring in the Hunter Catchment, and as such may be present in any of the local government areas of Cessnock, Maitland, Dungog, Singleton, Muswellbrook, Newcastle, Port Stephens, part of Mid-western Regional, and part of Upper Hunter. The vast majority of individuals (>90%) occur on private property, scattered across 30-40 sites, predominantly in the Muswellbrook and Upper Hunter LGAs. The 'Hunter Catchment' is defined by Australia's River Basins (Geoscience Australia 1997). In the Hunter Catchment *Cymbidium canaliculatum* is known to occur within Wollemi and Goulburn River National Parks. A 'cymbidium' orchid has also been recorded in Cameron's Gorge Nature Reserve, north-east of Scone. This is within known occurrences of the species. Typically grows in the hollows, fissures, trunks and forks of trees in dry sclerophyll forest or woodland, where its host trees typically occur on Permian Sediments of the Hunter Valley floor. It usually occurs singly or as a single clump, which can form large colonies on trees, between two and six metres from the ground. Recruitment, germination and persistence is reliant on rotting wood and mycorrhizal fungal associations. Within the Hunter Catchment, *Cymbidium canaliculatum* is most commonly found in	3	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			Eucalyptus albens (White Box) dominated woodlands (including those dominated by the intergrade *E. albens-moluccana*), much of which may constitute the endangered ecological community (EEC) 'White Box Yellow Box Blakely's Red Gum Woodland'. It has been found, less commonly, to grow on *E. dawsonii* (Slaty Box), *E. crebra* (Narrow-leaved Ironbark), *E. moluccana* (Grey Box), *Angophora floribunda* (Rough-barked Apple), *Acacia salicina* (Cooba) and on some other species, including dead stags. It is also known to use man-made structures, such as fence posts and wooden bridges as its host. *Cymbidium canaliculatum* flowers from September to November.				
Cynanchum elegans White-flowered Wax Plant	E	E	Restricted to eastern NSW where it is distributed from Brunswick Heads on the north coast to Gerroa in the Illawarra region. The species has been recorded as far west as Merriwa in the upper Hunter River valley. The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest; Coastal Tea-tree *Leptospermum laevigatum* – Coastal Banksia *Banksia integrifolia* subsp. *integrifolia* coastal scrub; Forest Red Gum *Eucalyptus tereticornis* aligned open forest and woodland; Spotted Gum *Corymbia maculata* aligned open forest and woodland; and Bracelet Honeymyrtle *Melaleuca armillaris* scrub to open scrub. Flowering occurs between August and May, with a peak in November. Flower abundance on individual plants varies from sparse to prolific. The fruit can take up to six months to mature. Seed production is variable and unreliable. Seeds are wind dispersed. It is considered to be unlikely that a soil seed bank for this species exists. Plants are capable of suckering from rootstock in response to occasional slashing or grazing. The fire response of the species is unknown although it has been know to reshoot following fire. Annual burning at one site has been shown to result in population decline.	0	Absent	Low	Low
Dichanthium setosum Bluegrass	V	V	Bluegrass occurs on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW, extending to northern Queensland. It occurs widely on private property, including in the Inverell, Guyra, Armidale and Glen Innes areas. Flowering time is mostly in summer. Associated with heavy basaltic black soils	0	Absent	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			and red-brown loams with clay subsoil. Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. (Often collected from disturbed open grassy woodlands on the northern tablelands, where the habitat has been variously grazed, nutrient-enriched and water-enriched). It is open to question whether the species tolerates or is promoted by a certain amount of disturbance, or whether this is indicative of the threatening processes behind its depleted habitat. Associated species include *Eucalyptus albens, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus viminalis, Myoporum debile, Aristida ramosa, Themeda triandra, Poa sieberiana, Bothriochloa ambigua, Medicago minima, Leptorhynchos squamatus, Lomandra* aff. *longifolia, Ajuga australis, Calotis hispidula* and *Austrodanthonia, Dichopogon, Brachyscome, Vittadinia, Wahlenbergia* and *Psoralea* species. Locally common or found as scattered clumps in broader populations. The extensive distribution and wide environmental tolerances make predictions about suitable habitat difficult.				
Eucalyptus camaldulensis Eucalyptus camaldulensis population in the Hunter catchment	E	-	The Hunter population occurs from the west at Bylong, south of Merriwa, to the east at Hinton, on the bank of the Hunter River, in the Port Stephens local government area. It has been recorded in the local government areas of Lithgow, Maitland, Mid-Western Regional, Muswellbrook, Port Stephens, Singleton and Upper Hunter. Prior to European settlement, between 10,000 and 20,000 ha of habitat suitable for the River Red Gum occurred in the Hunter catchment. Today only 19 stands are known, occupying at most c. 100 ha, the largest remnant being 15 - 20 ha in extent. Smaller remnants contain only one to several trees. The total number of individuals is estimated to be between 600 - 1000 mature or semi mature trees. May occur with *Eucalyptus tereticornis*, *Eucalyptus melliodora*, *Casuarina cunninghamiana* subsp. *cunninghamiana* and *Angophora* floribunda. Most of the occurrences are on private land and there are no known occurrences in conservation reserves. Prior to European settlement, it is likely that the species formed extensive stands of woodland and open woodland on the major floodplains of the Hunter and Goulburn	6	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			rivers, especially in areas where water impoundment occurs after flood. Since settlement, most of the floodplains have been cleared of woody vegetation. Flood mitigation works now prevent most minor floods from inundating floodplains. These flow changes, coupled with the clearing of native vegetation, have greatly reduced the extent of habitat favourable to the River Red Gum in the Hunter catchment.				
Eucalyptus glaucina Slaty Red Gum	V	V	Found only on the north coast of NSW and in separate districts: near Casino where it can be locally common, and farther south, from Taree to Broke, west of Maitland. Grows in grassy woodland and dry eucalypt forest. Grows on deep, moderately fertile and well-watered soils.	7	Marginal	Low	Low
Eucalyptus parramattensis subsp. decadens	V	V	There are two separate meta-populations of *E. parramattensis* subsp. *decadens*. The Kurri Kurri meta-population is bordered by Cessnock—Kurri Kurri in the north and Mulbring—Abedare in the south. Large aggregations of the subspecies are located in the Tomalpin area. The Tomago Sandbeds meta-population is bounded by Salt Ash and Tanilba Bay in the north and Williamtown and Tomago in the south. Generally occupies deep, low-nutrient sands, often those subject to periodic inundation or where water tables are relatively high. It occurs in dry sclerophyll woodland with dry heath understorey. It also occurs as an emergent in dry or wet heathland. Often where this species occurs, it is a community dominant. In the Kurri Kurri area, *E. parramattensis* subsp. *decadens* is a characteristic species of 'Kurri Sand Swamp Woodland in the Sydney Basin Bioregion', an endangered ecological community under the TSC Act. In the Tomago Sandbeds area, the species is usually associated with the 'Tomago Swamp Woodland' as defined by NSW NPWS (2000). Very little is known about the biology or ecology of this species. Flowers from November to January. Propagation mechanisms are currently poorly known. Seed dispersal is likely to be effected by wind and animals. Likely to be sensitive to over-frequent fire, however there is evidence (i.e. coppicing, epicormic shoots) that the species may be tolerant of low intensity fires. The species has a canopy stored seed bank for dispersal after fire events.	1	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
Euphrasia arguta	CE	CE	*Euphrasia arguta* was rediscovered in the Nundle area of the NSW north western slopes and tablelands in 2008. Prior to this, it had not been collected for 100 years. Historically, *Euphrasia arguta* has only been recorded from relatively few places within an area extending from Sydney to Bathurst and north to Walcha. The Royal Botanic Gardens Specimen Register records an additional location reported and vouchered in 2002 from near the Hastings River; and Euphrasia arguta was also recorded from the Barrington Tops in 2012. Historic records of the species noted the following habitats: 'in the open forest country around Bathurst in sub humid places', 'on the grassy country near Bathurst', and 'in meadows near rivers'. Plants from the Nundle area have been reported from eucalypt forest with a mixed grass and shrub understorey; here, plants were most dense in an open disturbed area and along the roadside, indicating the species had regenerated following disturbance. The number of plants at a given site may vary over time depending on the season and disturbance history. Near Nundle, local populations had apparently declined at sites that had been disturbed twice within three years, in contrast with sites that were disturbed only once. *Euphrasia arguta* has an annual habit and has been observed to die off over the winter months, with active growth and flowering occurring between January and April. As with other species of *Euphrasia*, this species is semi-parasitic and attaches to the roots of other associated plants.	0	Marginal	Low	Low
Grevillea parviflora subsp. *parviflora* Small-flower Grevillea	V	V	A low spreading to erect shrub, usually less than a metre high. Sporadically distributed throughout the Sydney Basin with the main occurrence centered around Picton, Appin and Bargo (and possibly further south to the Moss Vale area). Separate populations are also known further north from Putty to Wyong and Lake Macquarie on the Central Coast and Cessnock and Kurri Kurri in the Lower Hunter. Grows in sandy or light clay soils usually over thin shales. Occurs in a range of vegetation types from heath and shrubby woodland to open forest. Canopy species vary greatly with community type but generally are species that favour soils with a strong lateritic influence including *Eucalyptus fibrosa, E. parramattensis, Angophora bakeri* and	1	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			Eucalyptus sclerophylla. Found over a range of altitudes from flat, low-lying areas to upper slopes and ridge crests. Often occurs in open, slightly disturbed sites such as along tracks. Flowering has been recorded between July to December as well as April to May.				
Maundia triglochinoides	V	-	Restricted to coastal NSW and extending into southern Queensland. The current southern limit is Wyong; former sites around Sydney are now extinct. Grows in swamps, lagoons, dams, channels, creeks or shallow freshwater 30 - 60 cm deep on heavy clay, low nutrients. Flowering occurs during warmer months. Associated with wetland species e.g. Triglochin procerum. Probably wind pollinated. Diaspore is the seed and root tubers, which are probably dispersed by water. Spreads vegetatively, with tufts of leaves arising along rhizome. Populations expand following flood events and contract to more permanent wetlands in times of low rainfall. Flowers November-January.	1	Marginal	Low	Low
Melaleuca biconvexa Biconvex Paperbark	V	V	A shrub or small tree, usually up to 10 m tall, though occasionally as high as 20 m. Found in NSW, with scattered and dispersed populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north. Within the Gosford and Wyong area most populations occur on private land or on road reserves. Generally grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects. May occur in dense stands forming a narrow strip adjacent to watercourses, in association with other *Melaleuca* species or as an understorey species in wet forest types.Flowering occurs over just 3-4 weeks in September and October. Resprouts following fire.	0	Marginal	Low	Low
Persicaria elatior Knotweed		V	Known from the North Coast, Central Coast and South Coast Botanical Subdivisions in New South Wales. Knotweed has been collected from eight sites in NSW including Mt Dromedary (an old record) (NSW DECCW 2005ov), Moruya State Forest (SF), near Turlinjah (NSW DECCW 2005ov), the Upper Avon River catchment, north of Robertson (NSW DECCW 2005ov), Bermagui (NSW DECCW 2005ov), Picton Lakes	0	Absent	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			(NSW DECCW 2005ov), Richmond Range SF, near Casino (Quinn et al. 1995), Raymond Terrace, near Newcastle (NSW DECCW 2005ov), Cherry Tree SF and Gibberagee SF, near Grafton (NSW DECCW 2005ov). Knotweed normally grows in damp places, including coastal with swampy areas (Quinn et al. 1995), along watercourses, streams and lakes (NSW DECCW 2005ov), swamp forest (NSW DECCW 2005ov), disturbed areas (NSW DECCW 2005ov). Associated species include *Melaleuca linearifolia*, *M. quinquenervia*, *Lophostemon suaveolens*, *Casuarina glauca*, *Corymbia maculata*, *Pseudognaphalium luteoalbum* and *Polygonum hydropiper* (NSW undated; Quinn et al. 1995).				
Persoonia pauciflora North Rothbury Persoonia	CE	CE	Extremely restricted distribution; all but one of the plants which make up the only known population occur within a 2.5 km radius of the original specimen at North Rothbury in the Cessnock local government area. Within this range, there are three main sub-populations which comprise approximately 90% of the total population. The other 10% of the population occurs as scattered individuals in what is a relatively disturbed landscape. It is found in dry open forest or woodland dominated by Spotted Gum (*Corymbia maculata*), Broad-leaved Ironbark (*Eucalyptus fibrosa*) and/or Narrow-leaved Ironbark (*E. crebra*) and supporting a moderate to sparse shrub layer and grassy groundcover. The majority of the population is known to occur on silty sandstone soils derived from the Farley Formation. Flowers from January through to May. Its breeding system is unknown, but it is likely that native bees are required for pollination. Seedlings are present in most sub-populations which indicates that the population is capable of reproducing under favourable conditions. Its fire ecology is also unknown but, like other smooth-barked *Persoonia* species, it is probably killed by fire.	1	Absent	Low	Low
Prasophyllum sp. Wybong Leek Orchid	-	CE	Endemic to NSW, it is known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. Most populations are small, although the Wybong population contains by far the largest number of individuals. A perennial orchid, appearing as a single leaf over winter and spring.	0	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			Flowers in spring and dies back to a dormant tuber over summer and autumn Known to occur in open eucalypt woodland and grassland.				
Pterostylis gibbosa Illawarra Greenhood	E	E	All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. In the Illawarra region, the species grows in woodland dominated by Forest Red Gum Eucalyptus tereticornis, Woollybutt E. longifolia and White Feather Honey-myrtle Melaleuca decora. Near Nowra, the species grows in an open forest of Spotted Gum Corymbia maculata, Forest Red Gum and Grey Ironbark E. paniculata. In the Hunter region, the species grows in open woodland dominated by Narrow-leaved Ironbark E. crebra, Forest Red Gum and Black Cypress Pine Callitris endlicheri. The Illawarra Greenhood is a deciduous orchid that is only visible above the ground between late summer and spring, and only when soil moisture levels can sustain its growth. The leaf rosette grows from an underground tuber in late summer, followed by the flower stem in winter. After a spring flowering, the plant begins to die back and seed capsules form (if pollination has taken place).	1	Absent	Low	Low
Rhodamnia rubescens Scrub Turpentine	CE	-	Occurs in coastal districts north from Batemans Bay in New South Wales, approximately 280 km south of Sydney, to areas inland of Bundaberg in Queensland. Populations of *R. rubescens* typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000-1,600 mm. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	2	Absent	Low	Low
Rhodomyrtus psidioides Native Guava	CE	-	Occurs from Broken Bay, approximately 90 km north of Sydney, New South Wales, to Maryborough in Queensland. Populations are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur up to c. 120 km inland in the Hunter and Clarence River catchments and along the Border Ranges in NSW. Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. This species is	5	Absent	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			characterised being extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.				
Rutidosis heterogama Heath Wrinklewort	V	V	Recorded from near Cessnock to Kurri Kurri with an outlying occurrence at Howes Valley. On the Central Coast it is located north from Wyong to Newcastle. There are north coast populations between Wooli and Evans Head in Yuraygir and Bundjalung National Parks. It also occurs on the New England Tablelands from Torrington and Ashford south to Wandsworth south-west of Glen Innes. Grows in heath on sandy soils and moist areas in open forest, and has been recorded along disturbed roadsides.	2	Marginal	Low	Low
Syzygium paniculatum Magenta Lilly Pilly	E	V	Found only in NSW, in a narrow, linear coastal strip from Bulahdelah to Conjola State Forest. Has been recorded in widely scattered small populations along the NSW coast from Booti (near Forster) in the north to Conjola State Forest (near Jervis Bay) in the south. Found in rainforest on sandy soils or stabilised Quaternary sand dunes at low altitudes in coastal areas. Rainforests are often remnant stands of littoral or gallery rainforest. Associated species include *Alphitonia obliqu*, *Acmena smithii*, *Cryptocarya glaucescens*, *Toona C-XIIIblique*, *Eucalyptus saligna*, *Ficus fraseri*, *Syzygium oleosum*, *Acmena smithii*, *Cassine oblique*, *F. oblique*, *Glochidion ferdinandi*, *Endiandra sieberi*, *Synoum glandulosum*, *Podocarpus elatus*, *Notelaea longifolia*, *Guioa semiglauca* and *Pittosporum undulatum.* Is thought to tolerate wet and dry conditions on sands. On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities. Flowers December to March, with fruit ripe from March to May, occasionally to September.	2	Marginal	Low	Low
Tetratheca juncea Black-eyed Susan	V	V	Confined to the northern portion of the Sydney Basin bioregion and the southern portion of the North Coast bioregion in the local government areas of Wyong, Lake	0	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			Macquarie, Newcastle, Port Stephens, Great Lakes and Cessnock. It is usually found in low open forest/woodland with a mixed shrub understorey and grassy groundcover. However, it has also been recorded in heathland and moist forest. The majority of populations occur on low nutrient soils associated with the Awaba Soil Landscape. While some studies show the species has a preference for cooler southerly aspects, it has been found on slopes with a variety of aspects. It generally prefers well-drained sites below 200m elevation and annual rainfall between 1000 - 1200mm. The preferred substrates are sandy skeletal soil on sandstone, sandy-loam soils, low nutrients; and clayey soil from conglomerates, pH neutral. It usually spreads via underground stems which can be up to 50 cm long. Consequently, individual plants may be difficult to identify. It also reproduces sexually but this requires insect pollination.				
Thesium australe Austral Toadflax	V	V	Austral Toad-flax is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. It is also found in Tasmania and Queensland and in eastern Asia. Although originally described from material collected in the SW Sydney area, populations have not been seen in a long time. It may persist in some areas in the broader region. Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass (*Themeda australis*). A root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass.	0	Absent	Low	Low
EECs							
Central Hunter Grey Box—Ironbark Woodland in the New South Wales North Coast and	EEC	CEEC	Central Hunter Grey Box–Ironbark Woodland typically forms a woodland dominated by Narrow-leaved Ironbark (*Eucalyptus crebra*), Kurrajong (*Brachychiton populneus* subsp. *populneus*) and Grey Box (*Eucalyptus moluccana*). Other tree species such as Rough-barked Apple (*Angophora floribunda*) and Black Cypress Pine (*Callitris endlicheri*) may be present and occasionally dominate or co-dominate. A shrub layer is often present and common shrub species include Velvet Mock Olive (*Notelaea*	K	Absent	None	No

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
Sydney Basin Bioregions			*microcarpa* var. *microcarpa*), Coffee Bush (*Breynia oblongifolia*), Blackthorn (*Bursaria spinosa* subsp. *spinosa*), *Cassinia quinquefaria* and Sticky Hop-bush (*Dodonaea viscosa*). Subshrubs may also be common and include Narrawa Burr (*Solanum cinereum*), *Phyllanthus virgatus* and Small-leaf Bluebush (*Maireana microphylla*). Ground cover can be moderately dense to dense, and consist of numerous forbs and grass species as well as a small number of ferns, sedges and twiners. The more common species include Barbed Wire Grass (*Cymbopogon refractus*), Purple Wiregrass (*Aristida ramosa*), Kidney Weed (*Dichondra repens*), Poison Rock Fern (*Cheilanthes sieberi* subsp. *sieberi*), Bristly Cloak Fern (*Cheilanthes distans*), Tall Chloris (*Chloris ventricosa*), Slender Tick-trefoil (*Desmodium varians*), Yellow Burr-daisy (*Calotis lappulacea*), Many-flowered Mat-rush (*Lomandra multiflora* subsp. *multiflora*), Blue Trumpet (*Brunoniella australis*) and *Glycine tabacina*. Central Hunter Grey Box-Ironbark Woodland occurs in the Central Hunter Valley between about Singleton and Muswellbrook. It is known to occur in the Cessnock, Singleton and Muswellbrook LGAs but may occur elsewhere within the Sydney Basin Bioregion. The Central Hunter Grey Box-Ironbark Woodland - Scientific Committee Determination states that the mapped area of the community is approximately 46,920 ha. However, this figure is the pre-European estimated area. The actual mapped area is 14,818 ha. Central Hunter Grey Box-Ironbark Woodland occurs in areas of relatively low rainfall and high temperatures. It is associated mostly with Permian lithology, and is situated on gently undulating hills, slopes and valleys, or occasionally on rocky knolls.				
Central Hunter Ironbark Spotted Gum Grey Box Forest in the New South Wales North	EEC	CEEC	Typically forms an open forest or woodland dominated by Narrow-leaved Ironbark (*Eucalyptus crebra*), Spotted Gum (*Corymbia* maculata) and Grey Box (*Eucalyptus moluccana*). Other tree species such as Red Ironbark (*Eucalyptus fibrosa*) and Forest Red Gum (*Eucalyptus tereticornis*) may be present, and occasionally dominate or co-dominate. A sparse layer of small trees including Bulloak (*Allocasuarina luehmannii*) or Silver-stemmed Wattle (*Acacia*	K	Absent	None	No

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
Coast and Sydney Basin Bioregions			*parvipinnula*) may be present in some areas. The shrub layer varies from sparse to moderately dense. Common shrub species include Gorse Bitter Pea (*Daviesia ulicifolia* subsp. *ulicifolia*), Grey Bush-pea (*Pultenaea spinosa*), Coffee Bush (*Breynia oblongifolia*), Needlebush (*Hakea sericea*) and Blackthorn (*Bursaria spinosa* subsp. *spinosa*). Ground cover can be sparse to moderately dense and consists of numerous forbs, a few grass species and occasional ferns and sedges. Common species include Poison Rock Fern (*Cheilanthes sieberi* subsp. *sieberi*), Barbed Wire Grass (*Cymbopogon refractus*), Whiteroot (*Pratia purpurascens*), Many-flowered Mat-rush (*Lomandra multiflora* subsp. *multiflora*), *Pomax umbellata*, *Glycine tabacina*, Blue Flax-lily (*Dianella revoluta*), Slender Wire Lily (*Laxmannia gracilis*), *Vernonia cinerea* var. *cinerea*, Slender Tick-trefoil (*Desmodium varians*) and Kidney Weed (*Dichondra repens*). Central Hunter Ironbark-Spotted Gum-Grey Box Forest occurs in the central Hunter Valley mainly between Maitland and Muswellbrook. It has been recorded from Singleton, Cessnock and Muswellbrook LGAs but may occur elsewhere within the North Coast and Sydney Basin Bioregions. Central Hunter Ironbark-Spotted Gum-Grey Box Forest occupies undulating country including low rises and slopes, occurring on all aspects. It may also occur on alluvial and colluvial soils in valleys. It mostly occurs on clayey soils found on Permian sediments.				
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	VEC	Coastal Saltmarsh occurs in the intertidal zone along the NSW coast on the shores of estuaries and lagoons that are permanently or intermittently open to the sea. It is frequently found as a zone on the landward side of mangrove stands. Characteristic plants include *Baumea juncea*, *Juncus krausii*, *Sarcocornia quinqueflora*, *Sporobolus virginicus*, *Triglochin striata*, *Isolepis nodosa*, *Samolus repens*, *Selliera radicans*, *Suaeda australis* and *Zoysia macrantha*. Occasionally mangroves are scattered through the saltmarsh. Tall reeds may also occur, as well as salt pan. Species composition varies with elevation and latitude, with Saltmarsh	K	Absent	None	No

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			in southern NSW being generally more species-rich than further north. The sediment surface may support a diversity of seaweed species. Species restricted to coastal saltmarshes include *Distichlis distichophylla* (endangered), *Halosarcia pergranulata subsp. pergranulata*, *Wilsonia backhousei* (vulnerable) and *Wilsonia rotundifolia* (endangered). Coastal Saltmarsh occurs in a number of conservation reserves including the Ramsar listed sites at Towra Point and Kooragang Island Nature Reserves, and at Sydney Olympic Park.				
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	-	Associated with coastal areas subject to periodic flooding and in which standing fresh water persists for at least part of the year in most years. Typically occurs on silts, muds or humic loams in low-lying parts of floodplains, alluvial flats, depressions, drainage lines, backswamps, lagoons and lakes but may also occur in backbarrier landforms where floodplains adjoin coastal sandplains. Generally occur below 20 m elevation on level areas. They are dominated by herbaceous plants and have very few woody species. The structure and composition of the community varies both spatially and temporally depending on the water regime: Those that lack standing water most of the time are usually dominated by dense grassland or sedgeland vegetation, often forming a turf less than 0.5 metre tall and dominated by amphibious plants including *Paspalum distichum* (water couch), *Leersia hexandra* (swamp rice-grass), *Pseudoraphis spinescens* (mud grass) and *Carex appressa* (tussock sedge). Where they are subject to regular inundation and drying the vegetation may include large emergent sedges over 1 metre tall, such as *Baumea lebeian*, *Eleocharis equisetina* and *Lepironia lebeian*, as well as emergent or floating herbs such as *Hydrocharis dubia* (frogbit), *Philydrum lanuginosum* (frogsmouth), *Ludwigia peploides* subsp. *montevidensis* (water primrose), *Marsilea mutica* (nardoo) and *Myriophyllum* spp. (milfoils). As standing water becomes deeper or more permanent, amphibious and emergent plants become less abundant, while floating and submerged aquatic herbs become more abundant. These latter species include *Azolla filiculoides* var. *rubra*, *Ceratophyllum demersum* (hornwort), *Hydrilla*	K	Absent	None	No

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			verticillata (water thyme), *Lemna* spp. (duckweeds), *Nymphaea lebeian* (giant waterlily), *Nymphoides indica* (water snowflake), *Ottelia ovalifolia* (swamp lily) and *Potamageton* spp. (pondweeds). The threatened aquatic plants, *Aldrovanda vesiculosa* and *Najas marina*, also occur within this community. Known from along the majority of the NSW coast. However, it is distinct from Sydney Freshwater Wetlands which are associated with sandplains in the Sydney Basin bioregion. Extensively cleared and modified. In the 1990s the extent remaining were: 3% in the NSW North Coast bioregion, 66% in the lower Hunter – Central coast region, 40% on the Cumberland Plain, 70% in the Sydney – South Coast region, and 30% in the Eden region. There is less than 150 ha remaining on the Tweed lowlands (estimate in 1985); about 10,600 ha on the lower Clarence floodplain (in 1982); about 11,200 ha on the lower Macleay floodplain (in 1983); about 3,500 ha in the lower Hunter – Central Hunter region (in 1990s); less than 2,700 ha on the NSW south coast from Sydney to Moruya (in the mid-1990s), including about 660 ha on the Cumberland Plain (in 1998) and about 100 ha on the Illawarra Plain (in 2001); and less than 1000 ha in the Eden region (in 1990). Poorly reserved, known to occur in Ukerebagh, Tuckean, Tabbimoble Swamp, Hexham Swamp, Pambalong and Pitt Town Nature Reserves and Bungawalbin, Scheyville and Seven Mile Beach National Parks.				
Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions	EEC	-	Hunter Floodplain Red Gum Woodland generally forms a tall to very tall (18-35 m) woodland on floodplains and associated rises along the Hunter River and tributaries within the NSW North Coast and Sydney Basin Bioregions. Stands on major floodplains are generally dominated by *Eucalyptus camaldulensis* (River Red Gum) in combinations with *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus melliodora* (Yellow Box) and *Angophora floribunda* (Rough-barked Apple). Within the community stands of *Casuarina cunninghamiana* subsp. *cunninghamiana* (River Oak) and *Casuarina glauca* (Swamp Oak) can form a part of this community. Dominant groundcovers include *Cynodon dactylon* (Couch), *Alternanthera denticulata* (Lesser Joyweed), *Austrostipa verticillata* (Slender Bamboo Grass),	K	Absent	None	No

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			Dichondra repens (Kidney Weed), *Lepidium pseudohyssopifolium* (Peppercress), *Pratia concolor* (Poison Pratia), *Urtica incisa* (Stinging Nettle), *Einadia hastata* (Berry Saltbush), *Amaranthus macrocarpus* var. *macrocarpus* (Dwarf Amaranth), *Cyperus fulvus* (Sticky Sedge), *Cynoglossum australe* (Australian Hound's Tongue), *Cyperus gracilis* (Slender Flat-sedge), *Glycine tabacina* (Variable Glycine), *Geranium solanderi* (Native Geranium) and *Microlaena stipoides* var. *stipoides* (Weeping Rice Grass). The species assemblage that characterises the community is listed in the NSW Scientific Committee final determination. Hunter Floodplain Red Gum Woodland has been recorded from the local government areas of Maitland, Mid-Western, Muswellbrook, Singleton, and Upper Hunter but may occur elsewhere within the NSW North Coast and Sydney Basin Bioregions. Mapped occurrences include few remnants greater than 10 hectares and many small remnants less than 10 hectares, indicating severe fragmentation. Within the Central Hunter Valley geographic distribution is estimated to have been reduced by more than 90% of its pre-European extent. Hunter Floodplain Red Gum Woodland generally occurs on floodplains and floodplain rises. The community is known to contain the endangered River Red Gum population in the Hunter Catchment.				
Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregion	EEC	-	Hunter Lowland Redgum Forest is an open forest where the most common canopy tree species are *Eucalyptus tereticornis* (Forest Red Gum) and *E. punctata* (Grey Gum). Other frequently occurring canopy species are *Angophora floribunda* (Rough-barked Apple), *E. crebra* (Narrow-leaved Ironbark), *E. moluccana* (Grey Box) and *Corymbia maculata* (Spotted Gum). The shrub layer is open and common shrub species include *Breynia oblongifolia* (Coffee Bush), *Leucopogon juniperinus* (Prickly Beard-heath), *Daviesia ulicifolia* (Gorse Bitter Pea) and *Jacksonia scoparia* (Dogwood). The ground cover typically comprises grasses and herbs with common species being *Microlaena stipoides* var. *stipoides* Forest Weeping Grass, *Pratia purpurascens* (Whiteroot), *Lomandra multiflora* (Many-flowered Mat-rush), *Cymbopogon refractus* (Barbed Wire Grass), *Cheilanthes sieberi* (Poison Rock Fern)	K	Present	Recorded	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			and *Dichondra repens* (Kidney Weed). Occurs between Muswellbrook, Beresfield, Mulbring and Cessnock in the Lower Hunter in the Sydney Basin and North Coast bioregions. It has been recorded from the Maitland, Cessnock, Port Stephens, Muswellbrook and Singleton LGAs, but may occur elsewhere in these bioregions. Probably less than 500 hectares of this community remains. Hunter Lowland Redgum Forest occurs on the Permian sediments of the Hunter Valley floor. Much of the remaining community is disturbed and fragmented. The floristic composition and structure of the community is influenced by both the size and disturbance history of the remaining fragments. Consequently at heavily disturbed sites only some of the species which characterise the community may be present. Occurs on gentle slopes of depressions and drainage flats on the Hunter Valley floor.				
Hunter Valley Footslopes Slaty Gum Woodland in the Sydney Basin Bioregion	VEC	CEEC	Hunter Valley Footslopes Slaty Gum Woodland is a woodland, or occasionally an open forest, with a sparse to moderately dense tree layer with occasional small trees and a moderately dense to dense shrub layer. The tree canopy is typically dominated by *Eucalyptus dawsonii* (Slaty Gum) and/or *Eucalyptus moluccana* (Grey Box). *Acacia salicina* (Cooba) and *Allocasuarina luehmannii* (Bulloak) may form a small tree layer or be part of the upper-most canopy. Other trees which may be present include *Brachychiton populneus* subsp. *populneus* (Kurrajong), *Callitris endlicheri* (Black Cypress Pine), *Eucalyptus crebra* (Narrow-leaved Ironbark) and *Eucalyptus punctata* (Grey Gum). The shrub layer includes species such as *Olearia elliptica* (Sticky Daisy Bush), *Acacia cultriformis* (Knife-leaved Wattle), *Canthium odoratum* (Shiny-leaved Canthium), *Notelaea microcarpa* var. *microcarpa* (Native Olive), *Dodonaea viscosa* subsp. *cuneata* (Wedge-leaf Hopbush), *Acacia decora* (Western Golden Wattle) and *Solanum brownii* (Violet Nightshade). The groundcover is typically sparse to very sparse and is relatively species poor. The most frequently occurring species include *Dichondra repens* (Kidney Weed), *Lomandra multiflora* subsp. *multiflora* (Many-flowered Mat-rush), *Aristida ramosa* (Wire Grass), *Brunoniella australis* (Blue Trumpet), *Cymbopogon refractus* (Barbed Wire Grass), *Desmodium brachypodum*	K	Absent	None	No

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			(Large Tick-trefoil), *Fimbristylis dichotoma* (Common Fringe-rush) and *Sida corrugata* (Corrugated Sida). Hunter Valley Footslopes Slaty Gum Woodland mainly occurs on the southern side of the Hunter Valley from near Bulga to the Bylong/Goulburn River National Park area. It occurs on colluvial soils on exposed footslopes associated with the interface between Triassic Narrabeen sandstones and Permian sediments. Hunter Valley Footslopes Slaty Gum Woodland is known to occur in Singleton, Muswellbrook and Upper Hunter LGAs, and may occur in the Mid-western Regional LGA. Hunter Valley Footslopes Slaty Gum Woodland occurs on colluvial soils derived from Triassic sandstones and conglomerates that has covered the underlying Permian. It tends to occur in relatively hot and dry parts of the landscape.				
Hunter Valley Vine Thicket in the NSW North Coast and Sydney Basin Bioregions	EEC	-	Hunter Valley Vine Thicket typically forms a low forest, usually less than 10 m tall, with a closed canopy dominated by small trees. The canopy may include *Elaeodendron australe* (Red Olive Plum), *Geijera parviflora* (Wilga), *Notelaea microcarpa* var. *microcarpa* (Native Olive), *Alectryon oleifolius* subsp. *elongatus* (Western Rosewood), *Melia azedarach* (White Cedar) and *Brachychiton populneus* subsp. *populneus* (Kurrajong). Emergent eucalypts are common and include *Eucalyptus albens* (White Box), *E. dawsonii* (Slaty Box) and *E. crebra* (Narrow-leaved Ironbark). A shrub stratum is usually present and includes *Olearia elliptica* subsp. *elliptica* (Sticky Daisy Bush) and *Rhagodia parabolica* (Mealy Saltbush). Vines are common and include *Cissus opaca* (Small-leaved Water Vine), *Marsdenia flavescens* (Hairy Milk Vine), *Parsonsia eucalyptophylla* (Gargaloo) and *Pandorea pandorana* subsp. *pandorana* (Wonga Vine). Ground cover is generally sparse and includes *Urtica incisa* (Stinging Nettle) and *Austrostipa verticillata* (Slender Bamboo Grass). Hunter Valley Vine Thicket has a highly restricted geographic distribution in the central Hunter Valley. The community occurs mostly as patches of less than 10 ha, with a few larger patches exceeding 100 ha. Approximately 85% of the pre-European distribution of the community remains. The largest occurrence is at Brushy Hill	K	Absent	None	No

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			adjacent to Glenbawn Dam, north east of Scone. The only stand known to occur in a conservation reserve is at Mt Dangar within the Goulburn River National Park. Hunter Valley Vine Thicket has been recorded from the local government areas of Muswellbrook, Singleton, and Upper Hunter but may occur elsewhere within the Sydney Basin Bioregion and NSW North Coast Bioregion. Important site characteristics include low precipitation and high levels of solar radiation. This semi-arid soil environment will have selected the more xerophytic species from the available regional assemblage of rainforest species. Hunter Valley Vine Thicket mainly occurs on rocky slopes on Carboniferous sediments and volcanics, occasionally with limestone.				
Hunter Valley Weeping Myall Woodland in the Sydney Basin Bioregion	CEEC	CEEC	Hunter Valley Weeping Myall Woodland of the Sydney Basin bioregion typically has a dense to open tree canopy up to about 15 m tall, depending on disturbance and regrowth history. The most common tree is *Acacia pendula* (Weeping Myall), which may occur with *Eucalyptus crebra* (Narrow-leaved Ironbark), *A. salicina* (Cooba) and/or trees within the *A. homalophylla - A. melvillei* complex. Understorey shrubs may include *Canthium buxifolium* (Stiff Canthium), *Dodonaea viscosa* (Sticky Hopbush), *Geijera parviflora* (Wilga), *Notelaea microphylla* var. *microphylla* (Native Olive) and *Senna zygophylla* (Silver Cassia). However, these shrubs are absent from some stands. The groundcover varies from dense to sparse, and is comprised of grasses such as *Austrodanthonia fulva* (a wallaby grass) and *Themeda australis* (Kangaroo Grass), and low shrubs and herbs such as *Chrysocephalum apiculatum* (Common Everlasting), *Einadia nutans* subsp. *nutans* (Climbing Saltbush), *Enchylaena tomentosa* (Ruby Saltbush), *Maireana microphylla* (Eastern Cotton Bush) and *Ptilotus semilanatus*. Hunter Valley Weeping Myall Woodland of the Sydney Basin bioregion is currently known from parts of the Muswellbrook and Singleton Local Government Areas, but may occur elsewhere in the bioregion. It may also occur in the Upper Hunter Local Government Area within the Brigalow Belt South bioregion, although its presence has not yet been confirmed there. A section	K	Absent	None	No

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			of the community which occurs in heavy, brown clay soil at Jerry's Plains in the Hunter Valley is also listed by the Commonwealth as Critically Endangered. This community is associated with heavy clay soils on depositional landforms in the south-western part of the Hunter River valley floor. It is of conservation significance because it represents a disjunct coastal example of vegetation that is found principally on the western slopes of Great Dividing Range. Taxa such as *Acacia pendula, A. homalopyhlla-A. melvillei* complex, *Geijera parviflora, Enchylaena tomentosa, Maireana microphylla* and *Ptilotus semilanatus* are typical of the inland flora of southeastern Australia.				
Kurri Sand Swamp Woodland in the Sydney Basin Bioregion	EEC	-	Kurri Sand Swamp Woodland is a low woodland or heathland, generally with a low open canopy rarely exceeding 15 m in height and a shrubby understorey. The overstorey is usually dominated by *Eucalyptus parramattensis* subsp. *decadens* (Parramatta Red Gum) and *Angophora bakeri* (Narrow-leaved Apple) while other tree species that occur less frequently include *E. racemosa* (Narrow-leaved Scribbly Gum), *E. fibrosa* (Red Ironbark), *E.* sp. aff. *agglomerata* and *Corymbia gummifera* (Red Bloodwood). The shrub layer is typified by *Banksia spinulosa* (Hairpin Banksia), *Dillwynia retorta*, *Jacksonia scoparia* (Dogwood), *Hakea dactyloides* (Finger Hakea), *Acacia ulicifolia* (Prickly Moses), *Grevillea parviflora* subsp. *parviflora*, *Melaleuca nodosa* (Prickly-leaved Paperbark), *A. elongata* (Swamp Wattle) and *Lambertia formosa* (Mountain Devil). The common ground species include *Entolasia stricta* (Wiry Panic), *Ptilothris deusta*, *Pimelea linifolia* (Slender Rice Flower), *Aristida warburgii*, *Lomandra cylindrica* (Needle Mat-rush), *Lomandra glauca* (Pale Mat-rush) and *Anisopogon avenaceus* (Oat Speargrass). Known to occur in the Kurri Kurri–Cessnock area of the Cessnock LGA in the lower Hunter Valley, but it may occur elsewhere. Occurs on soils developed on poorly-drained Tertiary sand deposits that blanket Permian sediments. The community is floristically similar to the Tomago Sand Swamp Woodland as defined by NSW NPWS (2000). Plant species of conservation significance that are listed under the TSC Act occurring in the	K	Absent	None	No

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			community are *Eucalyptus parramattensis* subsp. *decadens*, *Acacia bynoeana* and *Grevillea parviflora* subsp. *parviflora*.				
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	CEEC	Generally a closed forest, the structure and composition of which is strongly influenced by its proximity to the ocean. The plant species of this community are predominantly rainforest species. Several species have compound leaves, and vines may be a major component of the canopy. These features differentiate littoral rainforest from forest or scrub, but while the canopy is dominated by rainforest species, scattered emergent individuals of sclerophyll species, such as *Angophora costata*, *Banksia integrifolia*, *Eucalyptus botryoides* and *Eucalyptus tereticornis* occur in many stands. Littoral Rainforest occurs only on the coast and is found at locations in the NSW North Coast Bioregion, Sydney Basin Bioregion and South East Corner Bioregion. Littoral Rainforest is very rare and occurs in many small stands. In total, it comprises less than one percent of the total area of rainforest in NSW. The largest known stand occurs in Iluka Nature Reserve, which is about 136 hectares in size. Occurs on sand dunes and on soil derived from underlying rocks. Stands on headlands exposed to strong wind-action may take the form of dense, wind-pruned thickets. Stands are generally taller in sheltered sites such as hind dunes, although wind-pruning may still occur on their windward sides. Most stands occur within two kilometres of the sea, though are occasionally found further inland within reach of the maritime influence. A number of species characteristic of Littoral Rainforest in NSW reach their southern limits at various places along the coast; a number of temperate species are restricted to the south coast; the total Littoral Rainforest flora declines from north to south. The species composition (flora and fauna) of a site will be influenced by its geographic location, the size of the site, its degree of exposure and rainfall, its disturbance history (including fire) and, if previously disturbed, the stage of regeneration.	P	Absent	None	No
Lower Hunter Spotted Gum—	EEC	-	This community is dominated by Spotted Gum *Corymbia maculata* and Broad-leaved Ironbark *Eucalyptus fibrosa*, while Grey Gum *E. punctata* and Grey Ironbark *E. crebra*	K	Present	Recorded in study	No

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
Ironbark Forest in the Sydney Basin Bioregion			occur occasionally. A number of other eucalypt species occur at low frequency, but may be locally common in the community. One of these species, *E. canaliculata*, intergrades extensively in the area with *E. punctata*. The understorey is marked by the tall shrub, *Acacia parvipinnula*, and by the prickly shrubs, *Daviesia ulicifolia, Bursaria spinosa, Melaleuca nodosa* and *Lissanthe strigosa*. Other shrubs include *Persoonia linearis, Maytenus silvestris* and *Breynia oblongifolia*. The ground layer is diverse; frequent species include *Cheilanthes sieberi, Cymbopogon refractus, Dianella revoluta, Entolasia stricta, Glycine clandestina, Lepidosperma laterale, Lomandra multiflora, Microlaena stipoides, Pomax umbellata, Pratia purpurascens, Themeda australis* and *Phyllanthus hirtellus*. In an undisturbed condition the structure of the community is typically open forest. If thinning has occurred, it may take the form of woodland or a dense thicket of saplings, depending on post-disturbance regeneration. Lower Hunter Spotted Gum-Ironbark Forest belongs to the Hunter - Macleay Dry Sclerophyll Forests vegetation class of Keith (2004). For a comprehensive list of species that characterise the community open the Scientific Determination link in the top right box. Restricted to a range of approximately 65 km by 35 km centred on the Cessnock - Beresfield area in the Central and Lower Hunter Valley. Within this range, the community was once widespread. A fragmented core of the community still occurs between Cessnock and Beresfield. Remnants occur within the Local Government Areas of Cessnock, Maitland, Singleton, Lake Macquarie, Newcastle and Port Stephens but may also occur elsewhere within the bioregion. Outliers are also present on the eastern escarpment of Pokolbin and Corrabare State Forests on Narrabeen Sandstone. Four large patches of Lower Hunter Spotted Gum-Ironbark Forest are estimated to have covered nearly 50,000 ha prior to European settlement, representing 75% of the total distribution. The community is currently mapped as occurring in more than 4,800 fragments, of which more than 4,500 are less than 10 ha in area. The four largest patches now cover about 7,000 ha, representing less than one-quarter of the current distribution, or about 10% of the estimated pre-European distribution. Approximately 1,600 hectares of Lower Hunter Spotted Gum-Ironbark Forest occurs within Werakata National Park. Occurs principally on Permian geology in the central to lower Hunter Valley. The Permian substrates most commonly supporting the community belong to the Dalwood Group, the Maitland Group and the Greta and			area however no direct impacts	

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			Tomago Coal Measures, although smaller areas of the community may also occur on the Permian Singleton and Newcastle Coal Measures and the Triassic Narrabeen Group. The community is strongly associated with, though not restricted to, the yellow podsolic and solodic soils of the Lower Hunter soil landscapes of Aberdare, Branxton and Neath. These substrates are said to produce 'moderately fertile' soils.				
Lower Hunter Valley Dry Rainforest in the Sydney Basin and NSW North Coast Bioregions	VEC	-	Lower Hunter Valley Dry Rainforest typically has a canopy of 15-25m high with 40-80% cover. The most common canopy trees include *Elaeocarpus obovatus* (Hard Quandong), *Baloghia inophylla* (Brush Bloodwood), *Streblus brunonianus* (Whalebone Tree), *Mallotus philippensis* (Red Kamala), *Capparis arborea* (Brush Caper Berry), *Olea paniculata* (Native Olive) and *Dendrocnide excelsa* (Giant Stinging Tree). Emergent trees 20 to 30m tall such as *Brachychiton populneus* subsp. *populneus* (Kurrajong), *Corymbia maculata* (Spotted Gum), *Brachychiton discolor* (Lacebark) and *Ficus rubiginosa* (Port Jackson Fig) are often present. Other tree and tall shrub species that are often present include *Guioa semiglauca* (Guioa), *Alectryon tomentosus* (Hairy Alectryon), *Alectryon subcinereus* (Wild Quince), *Melia azedarach* (White Cedar), *Melicope micrococca* (Hairy-leaved Doughwood), *Scolopia braunii* (Flintwood), *Claoxylon australe* (Brittlewood), *Elaeodendron australe* var. *australe* (Red Olive Plum), *Diospyros australis* (Black Plum) and *Pararchidendron pruinosum* var. *pruinosum* (Snow Wood). The shrub layer is dense with common species including *Notelaea longifolia* (Large Mock Olive), *Breynia oblongifolia* (Coffee Bush), *Clerodendrum tomentosum* (Hairy Clerodendrum) and *Pittosporum revolutum* (Hairy Pittosporum). Vines are abundant and include *Pandorea pandorana* subsp. *pandorana* (Wonga Vine), *Geitonoplesium cymosum* (Scrambling Lily), *Cayratia clematidea* (Native Grape), *Jasminum volubile* (Stiff Jasmine) and *Maclura cochinchinensis* (Cockspur Thorn). The ground cover is variable and is comprised of forbs, grasses and ferns. The common species include *Commelina cyanea* (Scurvy Weed), *Dichondra repens* (Kidney Weed), *Oplismenus aemulus* (Basket Grass) and *Adiantum aethiopicum* (Common Maidenhair). Lower Hunter Valley Dry Rainforest mainly occurs on the Barrington footslopes along the northern rim of the Hunter Valley Floor, where it occupies gullies and steep hillslopes with south facing aspects. It is also known from south of the Hunter River at Mt Bright and Mt View. Lower Hunter Valley Dry Rainforest has been recorded from the local government areas of	K	Absent	None	No

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			Cessnock, Maitland and Port Stephens, and is also likely to occur or have occurred in Muswellbrook, Singleton, Upper Hunter and Dungog LGAs. Lower Hunter Valley Dry Rainforest typically occurs on Carboniferous sediments in gullies and on steep hillslopes with south facing aspects. It is generally found at elevations less than 300 m ASL with a mean annual rainfall less than 900 mm.				
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	EEC	CEEC	Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions is an ecological community of subtropical rainforest and some related, structurally complex forms of dry rainforest. Lowland Rainforest, in a relatively undisturbed state, has a closed canopy, characterised by a high diversity of trees whose leaves may be mesophyllous and encompass a wide variety of shapes and sizes. Typically, the trees form three major strata: emergents, canopy and sub-canopy which, combined with variations in crown shapes and sizes results in an irregular canopy appearance. The trees are taxonomically diverse at the genus and family levels, and some may have buttressed roots. A range of plant growth forms are present in Lowland Rainforest, including palms, vines and vascular epiphytes. In disturbed stands of this community the canopy cover may be broken, or the canopy may be smothered by exotic vines. The Hawkesbury River notionally marks the southern limit of Lowland Rainforest in the NSW North Coast and Sydney Basin bioregions. South of the Sydney metropolitan area, Lowland Rainforest is replaced by Illawarra Subtropical Rainforest of the Sydney Basin Bioregion, which is listed as an endangered ecological community. Milton Ulladulla Subtropical Rainforest is also a related rainforest endangered ecological community that occurs still further south in the South East Corner Bioregion.	K	Absent	None	No
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	-	As the name suggests, this EEC is found on the river flats of the coastal floodplains. It has a tall open tree layer of eucalypts, which may exceed 40 m in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality. While the composition of the tree stratum varies considerably, the most widespread and abundant dominant trees include *Eucalyptus tereticornis* (forest red gum), *E. amplifolia* (cabbage gum), *Angophora floribunda* (rough-barked apple) and *A. subvelutina* (broad-leaved apple). *Eucalyptus baueriana* (blue box), *E. botryoides* (bangalay) and *E. elata* (river peppermint) may be common south from Sydney, *E. ovata* (swamp gum) occurs on the far south coast, *E. saligna* (Sydney blue gum) and	K	Absent	None	No

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			E. grandis (flooded gum) may occur north of Sydney, while *E. benthamii* is restricted to the Hawkesbury floodplain. A layer of small trees may be present, including *Melaleuca decora, M. styphelioides* (prickly-leaved teatree), *Backhousia myrtifolia* (grey myrtle), *Melia azaderach* (white cedar), *Casuarina cunninghamiana* (river oak) and *C. glauca* (swamp oak). Given its habitat, the community has an important role in maintaining river ecosystems and riverbank stability. Associated with silts, clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. Generally occurs below 50 m elevation, but may occur on localised river flats up to 250 m above sea level. The structure of the community may vary from tall open forests to woodlands, although partial clearing may have reduced the canopy to scattered trees. Typically form mosaics with other floodplain forest communities and treeless wetlands, and often fringe treeless floodplain lagoons or wetlands with semi-permanent standing water.				
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	EEC	This community is found on the coastal floodplains of NSW. It has a dense to sparse tree layer in which *Casuarina glauca* (swamp oak) is the dominant species northwards from Bermagui. Other trees including *Acmena smithii* (lilly pilly), *Glochidion* spp. (cheese trees) and *Melaleuca* spp. (paperbarks) may be present as subordinate species, and are found most frequently in stands of the community northwards from Gosford. Tree diversity decreases with latitude, and *Melaleuca ericifolia* is the only abundant tree in this community south of Bermagui. The understorey is characterised by frequent occurrences of vines, *Parsonsia straminea, Geitonoplesium cymosum* and *Stephania japonica* var. *discolor*, a sparse cover of shrubs, and a continuous groundcover of forbs, sedges, grasses and leaf litter. The composition of the ground stratum varies depending on levels of salinity in the groundwater. Under less saline conditions prominent ground layer plants include forbs such *Centella asiatica, Commelina cyanea, Persicaria decipiens* and *Viola banksii*; graminoids such as *Carex appressa, Gahnia clarkei, Lomandra longifolia, Oplismenus imbecillis*; and the fern *Hypolepis muelleri*. On the fringes of coastal estuaries, where soils are more saline, the ground layer may include the threatened grass species, *Alexfloydia repens*, as well as *Baumea juncea, Juncus kraussii,*	K	Absent	None	No

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			Phragmites australis, Selliera radicans and other saltmarsh species. For a comprehensive list of species that characterize the community open the Scientific Determination link in the top right box. Known from parts of the Local Government Areas of Tweed, Byron, Lismore, Ballina, Richmond Valley, Clarence Valley, Coffs Harbour, Bellingen, Nambucca, Kempsey, Hastings, Greater Taree, Great Lakes, Port Stephens, Maitland, Newcastle, Cessnock, Lake Macquarie, Wyong, Gosford, Pittwater, Warringah, Hawkesbury, Baulkham Hills, Hornsby, Lane Cove, Blacktown, Auburn, Parramatta, Canada Bay, Rockdale, Kogarah, Sutherland, Penrith, Fairfield, Liverpool, Bankstown, Wollondilly, Camden, Campbelltown, Wollongong, Shellharbour, Kiama, Shoalhaven, Eurobodalla and Bega Valley but may occur elsewhere in these bioregions. Major examples once occurred on the floodplains of the Clarence, Macleay, Hastings, Manning, Hunter, Hawkesbury, Shoalhaven and Moruya Rivers. The extent of the Swamp Oak Floodplain Forest prior to European settlement has not been mapped across its entire range. However, the remaining area of Swamp Oak Floodplain Forest is likely to represent much less than 30% of its original range. Major occurrences include: less than 350 ha on the Tweed lowlands; less than 650 ha on the lower Clarence floodplain; less than 400 ha on the lower Macleay floodplain; less than 3,200 ha in the lower Hunter - central Hunter region; less than 5,200 ha in the Sydney - South Coast region; and less than 1,000 ha in the Eden region. Small areas of Swamp Oak Floodplain Forest are contained within existing conservation reserves, including Stotts Island, Ukerebagh, Tuckean, Pambalong, Wamberal, Towra Point and Cullendulla Creek Nature Reserves and Bongil Bongil, Myall Lakes and Conjola National Parks. These occurrences are unevenly distributed throughout the range and unlikely to represent the full diversity of the community. Associated with grey-black clay-loams and sandy loams, where the groundwater is saline or sub-saline, on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains Generally occurs below 20 m (rarely above 10 m) elevation The				

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			structure of the community may vary from open forests to low woodlands, scrubs or reedlands with scattered trees.				
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	-	This swamp community has an open to dense tree layer of eucalypts and paperbarks although some remnants now only have scattered trees as a result of partial clearing. The trees may exceed 25 m in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality where the tree stratum is low and dense. For example, stands dominated by *Melaleuca ericifolia* typically do not exceed 8 m in height. The community also includes some areas of fernland and tall reedland or sedgeland, where trees are very sparse or absent. The most widespread and abundant dominant trees include *Eucalyptus robusta* (swamp mahogany), *Melaleuca quinquenervia* (paperbark) and, south from Sydney, *Eucalyptus botryoides* (bangalay) and *Eucalyptus longifolia* (woollybutt). Other trees may be scattered throughout at low abundance or may be locally common at few sites, including *Callistemon salignus* (sweet willow bottlebrush), *Casuarina glauca* (swamp oak) and *Eucalyptus resinifera* subsp. *hemilampra* (red mahogany), *Livistona australis* (cabbage palm) and *Lophostemon suaveolens* (swamp turpentine). A layer of small trees may be present, including *Acacia irrorata* (green wattle), *Acmena smithii* (lilly pilly), *Elaeocarpus reticulatus* (blueberry ash), *Glochidion ferdinandi* (cheese tree), *Melaleuca linariifolia* and *M. styphelioides* (paperbarks). Shrubs include *Acacia longifolia, Dodonaea triquetra, Ficus coronata, Leptospermum polygalifolium* subsp. *polygalifolium* and *Melaleuca* spp. Occasional vines include *Parsonsia straminea, Morinda jasminoides* and *Stephania japonica* var. *discolor*. The groundcover is composed of abundant sedges, ferns, forbs, and grasses including *Gahnia clarkei, Pteridium esculentum, Hypolepis muelleri, Calochlaena dubia, Dianella caerulea, Viola hederacea, Lomandra longifolia, Entolasia marginata* and *Imperata cylindrica*. On sites downslope of lithic substrates or with soils of clay-loam texture, species such as *Allocasuarina littoralis, Banksia oblongifolia, B. spinulosa, Ptilothrix deusta* and *Themeda australis*, may also be present in the understorey. Characteristic species are listed in the final determination for this complex (see links at top right). This community is known from parts of the Local Government Areas of Tweed, Byron, Lismore, Ballina, Richmond Valley, Clarence Valley, Coffs Harbour, Bellingen, Nambucca, Kempsey, Hastings, Greater Taree, Great Lakes and Port	K	Absent	None	No

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			Stephens, Lake Macquarie, Wyong, Gosford, Hornsby, Pittwater, Warringah, Manly, Liverpool, Rockdale, Botany Bay, Randwick, Sutherland, Wollongong, Shellharbour, Kiama and Shoalhaven but may occur elsewhere in these bioregions. Major examples once occurred on the floodplains of the Tweed, Richmond, Clarence, Macleay, Hastings and Manning Rivers, although smaller floodplains would have also supported considerable areas of this community. The exact amount of its original extent is unknown but it is much less than 30%. There are less than 350 ha of native vegetation attributable to this community on the Tweed lowlands, less than 2,500 ha on the Clarence floodplain, less than 700 ha on the Macleay floodplain, up to 7,000 ha in the lower Hunter – central coast district, and less than 1,000 ha in the Sydney – South Coast region. Small areas of Swamp Sclerophyll Forest on Coastal Floodplains are contained within existing conservation reserves, including Bungawalbin, Tuckean and Moonee Beach Nature Reserves, and Hat Head, Crowdy Bay, Wallingat, Myall Lakes and Garigal National Parks. These occurrences are unevenly distributed throughout the range and unlikely to represent the full diversity of the community. In addition, wetlands within protected areas are exposed to hydrological changes that were, and continue to be initiated outside their boundaries. Some areas of Swamp Oak Floodplain Forest are protected by State Environmental Planning Policy 14, although this has not always precluded impacts on wetlands from the development of major infrastructure. Associated with humic clay loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains. Generally occurs below 20 m (though sometimes up to 50 m) elevation. The composition of the community is primarily determined by the frequency and duration of waterlogging and the texture, salinity nutrient and moisture content of the soil, and latitude. The composition and structure of the understorey is influenced by grazing and fire history, changes to hydrology and soil salinity and other disturbance, and may have a substantial component of exotic grasses, vines and forbs.				
Sydney Freshwater Wetlands in the Sydney Basin Bioregion	EEC	-	A complex of vegetation types largely restricted to freshwater swamps in coastal areas. These also vary considerably due to fluctuating water levels and seasonal conditions. Characteristic species include sedges and aquatic plants such as *Baumea* species, *Eleocharis sphacelata*, *Gahnia* species, *Ludwigia peploides* ssp.	K	Absent	None	No

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			montevidensis and *Persicaria* species. Areas of open water may occur where drainage conditions have been altered and there may also be patches of emergent trees and shrubs. Occurs on sand dunes and low-nutrient sandplains along coastal areas in the Sydney Basin bioregion. Typically occur on silts, muds or humic loams in depressions, flats, drainage lines, backswamps, lagoons and lakes associated with coastal floodplains. It is known from the Lake Macquarie, Wyong, Gosford, Pittwater, Warringah, Woollahra, Waverley, Botany, Rockdale, Randwick, Sutherland and Wollongong local government areas, but is likely to occur elsewhere within the bioregion. Small areas of Sydney Freshwater Wetlands have been reported to occur in Wyrrabalong, Royal and Botany Bay National Parks. Has been extensively cleared and filled and remnants are often small and disturbed. Largely restricted to freshwater swamps in swales and depressions on sand dunes and low nutrient sandplains such as those of the Warriewood and Tuggerah soil landscapes. Swampy areas on alluvium with a saline influence do not fall within this community.				
Warkworth Sands Woodland in the Sydney Basin Bioregion	EEC	CEEC	Warkworth Sands Woodland is a low woodland dominated by *Angophora floribunda* (Rough-barked Apple) and *Banksia integrifolia* subsp. *integrifolia* (Coast Banksia). Other tree species may be present such as *Eucalyptus tereticornis* (Forest Red Gum)and *E. glaucina* (Slaty Red Gum). Shrub and ground layer species commonly present include *Acacia filicifolia* (Fern-leaved Wattle), *Melaleuca thymifolia* (Thyme Honey-myrtle), *Brachyloma daphnoides* (Daphne Heath), *Pteridium esculentum* (Bracken), *Pimelea linifolia* (Slender Rice Flower), *Imperata cylindrica* var. *major* (Blady Grass), *Chrysocephalum apiculatum* (Common Everlasting) and *Glycine clandestina*. Small drainage lines within the area occupied by this community may support the presence or higher abundance of certain species (such as *Melaleuca thymifolia*) and the absence or lower abundance of others (such as *Banksia integrifolia* subsp. *integrifolia*). Such areas are included as part of this community. Warkworth Sands Woodland is confined to a small area near Warkworth, about 15 km south-west of Singleton in the Hunter Valley. Only approximately 800 hectares of Warkworth Sands Woodland remains, none of which occurs within a conservation reserve. Due to the extent of vegetation clearing and modification, this is estimated	K	Absent	None	No

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			to be as little as 13% of its pre-settlement extent. Currently known to occur only in the Singleton LGA, but may occur elsewhere in the Sydney Basin Bioregion. Warkworth Sand Woodland occurs on aeolian sand deposits south of Singleton in the Hunter Valley. The species composition of a site will be influenced by the size of the site, recent rainfall or drought condition, and by its disturbance (including fire) history. Several threatened fauna species including *Petaurus norfolcensis* (Squirrel Glider), *Chthonicola saggitata* (Speckled Warbler), *Climacteris picumnus victoriae* (Brown Treecreeper) and *Pomatosomus temporalis temporalis* (Grey-crowned Babbler) have been recorded in this community.				
White Box Yellow Box Blakely's Red Gum Woodland	EEC	CEEC	White Box Yellow Box Blakely's Red Gum Woodland (commonly referred to as Box-Gum Woodland) is an open woodland community (sometimes occurring as a forest formation), in which the most obvious species are one or more of the following: White Box *Eucalyptus albens*, Yellow Box *E. melliodora* and Blakely's Red Gum *E. blakelyi*. Intact sites contain a high diversity of plant species, including the main tree species, additional tree species, some shrub species, several climbing plant species, many grasses and a very high diversity of herbs. The community also includes a range of mammal, bird, reptile, frog and invertebrate fauna species. Intact stands that contain diverse upper and mid-storeys and groundlayers are rare. Modified sites include the following: Areas where the main tree species are present ranging from an open woodland formation to a forest structure, and the groundlayer is predominantly composed of exotic species; and sites where the trees have been removed and only the grassy groundlayer and some herbs remain. The Australian Government listing of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland is slightly different to the NSW listing. Areas that are part of the Australian Government listed ecological community must have either: An intact tree layer and predominately native ground layer; or an intact native ground layer with a high diversity of native plant species but no remaining tree layer. Box-Gum Woodland is found from the Queensland border in the north, to the	k	Absent	None	No

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			Victorian border in the south. It occurs in the tablelands and western slopes of NSW. Characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakely's Red Gum. The trees may occur as pure stands, mixtures of the three species or in mixtures with other trees, including wattles. Commonly co-occurring eucalypts include Apple Box (*E. bridgesiana*), Red Box (*E. polyanthemos*), Candlebark (*E. rubida*), Snow Gum (*E. pauciflora*), Argyle Apple (*E. cinerea*), Brittle Gum (*E. mannifera*), Red Stringybark (*E. macrorhyncha*), Grey Box (*E. microcarpa*), Cabbage Gum (*E. amplifolia*) and others. The understorey in intact sites is characterised by native grasses and a high diversity of herbs; the most commonly encountered include Kangaroo Grass (*Themeda australis*), Poa Tussock (*Poa sieberiana*), wallaby grasses (*Austrodanthonia* spp.), spear-grasses (*Austrostipa* spp.), Common Everlasting (*Chrysocephalum apiculatum*), Scrambled Eggs (*Goodenia pinnatifida*), Small St John's Wort (*Hypericum gramineum*), Narrow-leafed New Holland Daisy (*Vittadinia muelleri*) and blue-bells (*Wahlenbergia* spp.). Shrubs are generally sparse or absent, though they may be locally common. Remnants generally occur on fertile lower parts of the landscape where resources such as water and nutrients are abundant. Sites with particular characteristics, including varying age classes in the trees, patches of regrowth, old trees with hollows and fallen timber on the ground are very important as wildlife habitat. Sites in the lowest parts of the landscape often support very large trees which have leafy crowns and reliable nectar flows - sites important for insectivorous and nectar feeding birds. Sites that retain only a grassy groundlayer and with few or no trees remaining are important for rehabilitation, and to rebuild connections between sites of better quality. Remnants support many species of threatened fauna and flora. Retention of remnants is important as they contribute to productive farming systems (stock shelter, seed sources, sustainable grazing and water-table and salinity control). The fauna of remnants (insectivorous birds, bats, etc) can contribute to insect control on grazing properties. Some of the component species (e.g. wattles, she-oaks, native legumes) fix nitrogen that is made available to other species in the community, while fallen timber and leaves recycle				

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			their nutrients. Disturbed remnants are considered to form part of the community, including where the vegetation would respond to assisted natural regeneration.				

C.2 EVALUATION OF THE LIKELIHOOD AND EXTENT OF IMPACT ON THREATENED FAUNA

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

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
Aves							
Anseranas semipalmata Magpie Goose	V	-	The Magpie Goose is still relatively common in the Australian northern tropics, but had disappeared from south-east Australia by 1920 due to drainage and overgrazing of reed swamps used for breeding. Since the 1980s there have been an increasing number of records in central and northern NSW. Vagrants can follow food sources to south-eastern NSW. Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes. Activities are centred on wetlands, mainly those on floodplains of rivers and large shallow wetlands formed by run-off; breeding can occur in both summer and winter dominated rainfall areas and is strongly influenced by water level; most breeding now occurs in monsoonal areas; nests are formed in trees over deep water; breeding is unlikely in south-eastern NSW. Often seen in trios or flocks on shallow wetlands, dry ephemeral swamps, wet grasslands and floodplains; roosts in tall vegetation.	1	Marginal	Low	Low
Anthochaera phrygia Regent Honeyeater	CE	CE	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. Once recorded between Adelaide and the central coast of Queensland, its range has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee	1	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests. The Regent Honeyeater is a flagship threatened woodland bird whose conservation will benefit a large suite of other threatened and declining woodland fauna. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. Birds are occasionally seen on the south coast. In the last 10 years Regent Honeyeaters have been recorded in urban areas around Albury where woodlands tree species such as Mugga Ironbark and Yellow Box were planted 20 years ago. The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Other tree species may be regionally important. For example the Lower Hunter Spotted Gum forests have recently been demonstrated to support regular breeding events. Flowering of associated species such as Thin-leaved Stringybark *Eucalyptus eugenioides* and other Stringybark species, and Broad-leaved Ironbark *E. fibrosa* can also contribute important nectar flows at times. Nectar and fruit from the mistletoes *Amyema miquelii, A. pendula* and *A. cambagei* are also utilised. When nectar is scarce lerp and honeydew can comprise a large proportion of the diet. Insects make up about 15% of the total diet and are important				

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			components of the diet of nestlings. Colour-banding of Regent Honeyeater has shown that the species can undertake large-scale nomadic movements in the order of hundreds of kilometres. However, the exact nature of these movements is still poorly understood. It is likely that movements are dependent on spatial and temporal flowering and other resource patterns. To successfully manage the recovery of this species a full understanding of the habitats used in the non-breeding season is critical. There are three known key breeding areas, two of them in NSW - Capertee Valley and Bundarra-Barraba regions. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest dominated by River Sheoak. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and Sheoaks. Also nest in mistletoe haustoria. An open cup-shaped nest is constructed of bark, grass, twigs and wool by the female. Two or three eggs are laid and incubated by the female for 14 days. Nestlings are brooded and fed by both parents at an average rate of 23 times per hour and fledge after 16 days. Fledglings fed by both parents 29 times per hour.				
Artamus cyanopterus cyanopterus Dusky Woodswallow	V	-	Found in open forests/woodlands; timbered paddocks; coastal/sub-inland scrubs; golf courses, orchards, roadside timber and street trees. Ranging from Eastern Australia to Tasmania; from Atherton Tableland to Kangaroo Island and Bright coast (SA); in WA, from Bright coast inland to c. Menzies-Paynes Find west to Moora. Summer breeding to upper Flinders R.-Windorah (q)l Paroo R. - Broken Hill (NSW)l Flinders Ras. - Kingoonya - Cook (SA).	2	Marginal	Low	Low
Botaurus poiciloptilus Australasian Bittern	E	E	In NSW, this species occurs along the coast and is frequently recorded in the Murray-Darling Basin, notably in floodplain wetlands of the Murrumbidgee, Lachlan, Macquarie and Gwydir Rivers. Occurs in permanent freshwater wetlands with tall, dense vegetation. Favours permanent and seasonal	0	Absent	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			freshwater habitats, particularly those dominated by sedges, rushes and/or reeds (e.g. *Phragmites, Cyperus, Eleocharis, Juncus, Typha, Baumea, , Bolboschoenus*) or cutting grass (*Gahnia*) growing over muddy or peaty substrate. Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely-vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch. In Australia, the Bittern occurs with the Australian Painted Snipe *Rostratula benghalensis australis.*				
Calidris ferruginea Curlew Sandpiper	E	CE	The Curlew Sandpiper is distributed around most of the Australian coastline (including Tasmania). It occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration. The Curlew Sandpiper breeds in Siberia and migrates to Australia (as well as Africa and Asia) for the non-breeding period, arriving in Australia between August and November, and departing between March and mid-April. It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on shingle, shell or sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores. Curlew Sandpipers are omnivorous, feeding on worms, molluscs, crustaceans, insects and some seeds. Birds breed at 2 years of age	0	Absent	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			and the oldest recorded bird is 19 years old. Most birds caught in Australia are between 3 and 5 years old.				
Calidris tenuirostris Great Knot	-	CE	Occurs within sheltered, coastal habitats containing large, intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons. Often recorded on sandy beaches with mudflats nearby, sandy spits and islets and sometimes on exposed reefs or rock platforms. Migrates to Australia from late August to early September, although juveniles may not arrive until October-November. Most birds return north in March and April, however some individuals may stay over winter in Australia. Forages for food by methodically thrusting its bill deep into the mud to search for invertebrates, such as bivalve molluscs, gastropods, polychaete worms and crustaceans.	0	Absent	Low	Low
Calyptorhynchus lathami Glossy Black-Cockatoo	V	-	The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia. Dependent on large hollow-bearing eucalypts for nest sites. One or two eggs are laid between March and August. Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly Black She-oak (*Allocasuarina littoralis*), Forest She-oak (*A. torulosa*) or Drooping She-oak (*A. verticillata*) occur. In the Riverina area, inhabits open woodlands dominated by Belah (*Casuarina cristata*). Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding the cones with the massive bill.	1	Marginal	Low	Low
Charadrius leschenaultia	-	V	The Double-banded Plover is found on littoral, estuarine and fresh or saline terrestrial wetlands and also saltmarsh, grasslands and pasture. It occurs on	0	Absent	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
Greater Sandplover			muddy, sandy, shingled or sometimes rocky beaches, bays and inlets, harbours and margins of fresh or saline terrestrial wetlands such as lakes, lagoons and swamps, shallow estuaries and rivers. The species is sometimes associated with coastal lagoons, inland saltlakes and saltworks. It is also found on seagrass beds, especially *Zostera*, which, when exposed at low tide, remain heavily saturated or have numerous water-filled depressions. This species sometimes utilises kelp beds. The Double-banded Plover eats molluscs, insects, worms, crustaceans and spiders and sometimes seeds and fruits. The Double-banded Plover roosts on bare open areas or among vegetation and also on offshore islets.				
Charadrius mongolus Lesser Sand Plover	V	E	In non-breeding grounds in Australia, this species usually occurs in coastal littoral and estuarine environments. It inhabits large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops. It also sometime occurs in short saltmarsh or among mangroves. The species also inhabits saltworks and near-coastal saltpans, brackish swamps and sandy or silt islands in river beds. The species feeds mostly on extensive, freshly-exposed areas of intertidal sandflats and mudflats in estuaries or beaches, or in shallow ponds in saltworks. They roost near foraging areas, on beaches, banks, spits and banks of sand or shells, and occasionally on rocky spits, islets or reefs. They rarely roost in mangroves. The species does not breed in Australia.	0	Absent	Low	Low
Chthonicola sagittata Speckled Warbler	V	-	The Speckled Warbler has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. The species is most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast. There has been a decline in population density throughout its range, with the decline	4	Absent	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			exceeding 40% where no vegetation remnants larger than 100ha survive. The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. The diet consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees. Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger home-range when not breeding. The rounded, domed, roughly built nest of dry grass and strips of bark is located in a slight hollow in the ground or the base of a low dense plant, often among fallen branches and other litter. A side entrance allows the bird to walk directly inside. A clutch of 3-4 eggs is laid, between August and January, and both parents feed the nestlings. The eggs are a glossy red-brown, giving rise to the unusual folk names 'Blood Tit' and 'Chocolatebird'. Some cooperative breeding occurs. The species may act as host to the Black-eared Cuckoo. Speckled Warblers often join mixed species feeding flocks in winter, with other species such as Yellow-rumped, Buff-rumped, Brown and Striated Thornbills.				
Circus assimilis Spotted Harrier	V	-	The Spotted Harrier occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges, and rarely in Tasmania. Individuals disperse widely in NSW and comprise a single population. They occur in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months. Preys on terrestrial mammals (e.g.	3	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			bandicoots, bettongs, and rodents), birds and reptile, occasionally insects and rarely carrion.				
Daphoenositta chrysoptera Varied Sittella	V	-	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands, with a nearly continuous distribution in NSW from the coast to the far west. It inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland. The Varied Sittella feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees, and from small branches and twigs in the tree canopy. It builds a cup-shaped nest of plant fibres and cobweb in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years. Foraging and nesting habitat present within study area in woodlands and forests with rough barked trees. Species is generally sedentary and has not been recorded within the study area previously (closest record over one kilometre away).	6	Marginal	Low	Low
Dasyornis brachypterus Eastern Bristlebird	E	E	The distribution of the Eastern Bristlebird has contracted to three disjunct areas of south-eastern Australia: southern Queensland/northern NSW, the Illawarra Region and in the vicinity of the NSW/Victorian border. The estimated population size is less than 2000 individuals occupying a total area of about 120 sq km. There are now only four populations in the southern Queensland/northern NSW area with a total of 35 birds, compared to 15 years ago when 14 populations and 154 birds were recorded. This population once extended as far south as at least Dorrigo and has recently been identified as a separate ultrataxon (*monoides)* but further research is being undertaken to determine the validity of this. The remaining populations are the nominate ultrataxon (*brachypterus*) and once extended at least to what is now the Sydney urban area. The Illawarra population comprises an estimated 1600 birds, mainly from Barren Grounds Nature Reserve, Budderoo National Park and the Jervis Bay area. The southern population in Nadgee Nature Reserve and Howe's Flat is around 200 birds. Further surveys are required in parts of Ben Boyd National Park and Sydney	0	Absent	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			Catchment Authority lands to determine whether further populations of the Eastern Bristlebird occur in these areas. Habitat is characterised by dense, low vegetation including heath and open woodland with a heathy understorey; in northern NSW occurs in open forest with tussocky grass understorey; all of these vegetation types are fire prone. Age of habitat since fires (fire-age) is of paramount importance to this species; Illawarra and southern populations reach maximum densities in habitat that has not been burnt for at least 15 years; however, in the northern NSW population a lack of fire in grassy forest may be detrimental as grassy tussock nesting habitat becomes unsuitable after long periods without fire; northern NSW birds are usually found in habitats burnt five to 10 years previously. Shy and cryptic and rarely flies, although can be seen scampering over the ground; when approached, may move to a lookout perch 1 m or more above the ground, then retreat into dense vegetation. Feeds on a variety of insects, particularly ants. Nests are elliptical domes constructed on or near the ground amongst dense vegetation. Suitable habitat is present in upland swamps and heaths.				
Ephippiorhynchus asiaticus Black-necked Stork	E	-	The species is widespread across coastal northern and eastern Australia, becoming increasingly uncommon further south into NSW, and rarely south of Sydney. Some birds may move long distances and can be recorded well outside their normal range. Inhabits permanent freshwater wetlands including margins of billabongs, swamps, shallow floodwaters, and adjacent grasslands and savannah woodlands; can also be found occasionally on inter-tidal shorelines, mangrove margins and estuaries. Feeds in shallow, still water on a variety of prey including fish, frogs, eels, turtles, crabs and snakes. Breeds in late summer in the north, and early summer further south. A large nest, up to 2 m in diameter, is made in a live or dead tree, in or near a freshwater swamp. Two to four eggs are laid; incubation is by both parents.	40	Absent	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
Epthianura albifrons White-fronted Chat	V	-	The White-fronted Chat is found across the southern half of Australia, from southernmost Queensland to southern Tasmania, and across to Western Australia as far north as Carnarvon. Found mostly in temperate to arid climates and very rarely sub-tropical areas, it occupies foothills and lowlands up to 1000 m above sea level. In NSW, it occurs mostly in the southern half of the state, in damp open habitats along the coast, and near waterways in the western part of the state. Along the coastline, it is found predominantly in saltmarsh vegetation but also in open grasslands and sometimes in low shrubs bordering wetland areas. Gregarious species, usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. They are insectivorous, feeding mainly on flies and beetles caught from or close to the ground. Have been observed breeding from late July through to early March, with 'open-cup' nests built in low vegetation. Nests in the Sydney region have also been seen in low isolated mangroves. Nests are usually built about 23 cm above the ground (but have been found up to 2.5 m above the ground). Two to three eggs are laid in each clutch, and the complete nesting cycle from nest-building to independent young is approximately 50 days. Birds can breed at one year of age and are estimated to live for five years.	1	Absent	Low	Low
Erythrotriorchis radiatus Red Goshawk	CE	V	This unique Australian endemic raptor is distributed sparsely through northern and eastern Australia, from the western Kimberley Division of northern Western Australia to north-eastern Queensland and south to far north-eastern NSW, and with scattered records in central Australia. The species is very rare in NSW, extending south to about 30°S, with most records north of this, in the Clarence River Catchment, and a few around the lower Richmond and Tweed Rivers. Formerly, it was at least occasionally reported as far south as Port Stephens. Red Goshawks inhabit open woodland and forest, preferring a mosaic of vegetation types, a large population of birds as	0	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			a source of food, and permanent water, and are often found in riparian habitats along or near watercourses or wetlands. In NSW, preferred habitats include mixed subtropical rainforest, *Melaleuca* swamp forest and riparian *Eucalyptus* forest of coastal rivers. Adults appear to occupy territories throughout the year and breeding territories are traditionally used from year to year. Adults have large home-ranges, estimated in the Northern Territory to be as great as about 120 km2 for females and 200 km^2 for males.				
Glossopsitta pusilla Little Lorikeet	V	-	The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Nomadic movements are common, influenced by season and food availability. 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. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species. Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards. Roosts in treetops, often distant from feeding areas. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like Allocasuarina. Nesting season extends from May to September.	21	Marginal	Low	Low
Grantiella picta	V	V	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding	0	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
Painted Honeyeater			occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus *Amyema*. Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches**.**				
Haliaeetus leucogaster White-bellied Sea-Eagle	V	M	White-bellied Sea-Eagles are a common sight in coastal and near coastal areas of Australia. Birds form permanent pairs that inhabit territories throughout the year. Their loud "goose-like" honking call is a familiar sound, particularly during the breeding season. Birds are normally seen, perched high in a tree, or soaring over waterways and adjacent land. In addition to Australia, the species is found in New Guinea, Indonesia, China, south-east Asia and India. The White-bellied Sea-Eagle feeds mainly off aquatic animals, such as fish, turtles and sea snakes, but it takes birds and mammals as well. It is a skilled hunter, and will attack prey up to the size of a swan. Sea-Eagles also feed on carrion (dead prey) such as sheep and fish along the waterline. They harass smaller birds, forcing them to drop any food that they are carrying. Sea-Eagles feed alone, in pairs or in family groups. 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 be also be placed on the ground or on rocks, where there are no suitable trees. At the start of the breeding season (May to October), the nest is lined with fresh green leaves and twigs. The female carries out most of the incubation of the two white eggs, but the male performs this duty from time to time.	17	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
Hamirostra melanosternon Black-breasted Buzzard	V	-	The Black-breasted Buzzard is found sparsely in areas of less than 500mm rainfall, from north-western NSW and north-eastern South Australia to the east coast at about Rockhampton, then across northern Australia south almost to Perth, avoiding only the Western Australian deserts. Lives in a range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat. Also hunts over grasslands and sparsely timbered woodlands. Not a powerful hunter, despite its size, mostly taking reptiles, small mammals, birds, including nestlings, and carrion. Also specialises in feeding on large eggs, including those of emus, which it cracks on a rock. Breeds from August to October near water in a tall tree. The stick nest is large and flat and lined with green leaves. Normally two eggs are laid.	1	Marginal	Low	Low
Hirundapus caudacutus White-throated Needletail		V	The White-throated Needletail is widespread in eastern and south-eastern Australia (Barrett et al. 2003; Blakers et al. 1984; Higgins 1999). In eastern Australia, it is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains. The species occurs at numerous and widespread sites in eastern Australia. In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland (Higgins 1999). They also commonly occur over heathland (Cooper 1971; Learmonth 1951; McFarland 1988), but less often over treeless areas, such as grassland or swamps (Cooper 1971; Gosper 1981; Learmonth 1951). When flying above farmland, they are more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of	0	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			paddocks (Emison & Porter 1978; Friend 1982; Tarburton 1993). In coastal areas, they are sometimes seen flying over sandy beaches or mudflats (Cooper 1971; Crompton 1936; Davis 1965), and often around coastal cliffs and other areas with prominent updraughts, such as ridges and sand-dunes. The species has been recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows (Corben et al. 1982; Day 1993; Quested 1982; Tarburton 1993), though the number of references to Needletails roosting in trees possibly over-emphasizes such occurrences (Higgins 1999).				
Lathamus discolor Swift Parrot	E	CE	Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south west slopes. Migrates to the Australian south-east mainland between February and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Forest Red Gum *E. tereticornis*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Inland Grey Box *E. microcarpa*, Grey Box *E. moluccana*, Blackbutt *E. pilularis*, and Yellow Box *E. melliodora*. Return to some foraging sites on a cyclic basis depending on food availability. Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum *Eucalyptus globulus*.	3	Marginal	Low	Low
Limosa lapponica Bar-tailed Godwit	-	V	The Bar-tailed Godwit is a migratory wader which undertakes the largest non-stop flight of any bird. The trans-Pacific route from its breeding grounds in	0	Absent	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			the Arctic to its non-breeding grounds in the southern hemisphere covers over 11,000 km. Birds arrive in New South Wales between August and October and then leave between February and April, with a small number of individuals overwintering. The subspecies is most frequently recorded along major coastal river estuaries and sheltered embayments, particularly the Tweed, Richmond, Clarence, Macleay, Hastings, Hunter and Shoalhaven river estuaries, Port Stephens and Botany Bay. It is a rare visitor to wetlands away from the coast with scattered records as far west as along the Darling River and the Riverina. It is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. Less frequently it occurs in salt lakes and brackish wetlands, sandy ocean beaches and rock platforms. It often occurs around beds of seagrass, and sometimes in nearby saltmarsh or the outer margins of mangrove areas. It forages at low to mid tide in shallow water or along the water's edge on sandy substrates on intertidal flats, banks and beaches or on soft mud substrates. Its diet consists of worms, molluscs, crustaceans, insects and some plant material. In NSW its high tide roost areas on sandy beaches, sandbars, spits and near-coastal saltmarsh are frequently shared with other shorebirds. It is rarely found on inland wetlands or in areas of short grass such as farmland, paddocks and airstrips. In large part, the observed decline in Bar-tailed Godwit (Western Alaskan) numbers across Australia stems from ongoing loss of intertidal mudflat habitat at key migration staging sites in the Yellow Sea.				
Melithreptus gularis gularis Black-chinned Honeyeater	V	-	The Black-chinned Honeyeater has two subspecies, with only the nominate (*gularis*) occurring in NSW. The other subspecies (*laetior*) was formerly considered a separate species (Golden-backed Honeyeater) and is found in northern Australia between central Queensland west to the Pilbara in	1	Absent	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
(eastern subspecies)			Western Australia. The eastern subspecies extends south from central Queensland, through NSW, Victoria into south eastern South Australia, though it is very rare in the last state. In NSW it is widespread, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. It is rarely recorded east of the Great Dividing Range, although regularly observed from the Richmond and Clarence River areas. It has also been recorded at a few scattered sites in the Hunter, Central Coast and Illawarra regions, though it is very rare in the latter. Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*) and Forest Red Gum (*E. tereticornis*). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees. A gregarious species usually seen in pairs and small groups of up to 12 birds. Feeding territories are large making the species locally nomadic. Recent studies have found that the Black-chinned Honeyeater tends to occur in the largest woodland patches in the landscape as birds forage over large home ranges of at least 5 hectares. Moves quickly from tree to tree, foraging rapidly along outer twigs, underside of branches and trunks, probing for insects. Nectar is taken from flowers, and honeydew is gleaned from foliage. Breeds solitarily or co-operatively, with up to five or six adults, from June to December. The nest is placed high in the crown of a tree, in the uppermost lateral branches, hidden by foliage. It is a compact, suspended, cup-shaped nest. Two or three eggs are laid and both parents and occasionally helpers feed the young.				

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
Ninox connivens Barking Owl	V	-	Inhabits eucalypt woodland, open forest, swamp woodlands and, especially in inland areas, timber along watercourses. Denser vegetation is used occasionally for roosting. During the day they roost along creek lines, usually in tall understorey trees with dense foliage such as *Acacia* and *Casuarina* species, or the dense clumps of canopy leaves in large *Eucalypts*. Feeds on a variety of prey, with invertebrates predominant for most of the year, and birds and mammals such as smaller gliders, possums, rodents and rabbits becoming important during breeding. Live alone or in pairs. Territories range from 30 to 200 hectares and birds are present all year. Three eggs are laid in nests in hollows of large, old eucalypts including River Red Gum (*Eucalyptus camaldulensis*), White Box (*Eucalyptus albens*), (Red Box) *Eucalyptus polyanthemos* and Blakely's Red Gum (*Eucalyptus blakelyi*). Breeding occurs during late winter and early spring.	3	Marginal	Low	Low
Ninox strenua Powerful Owl	V	-	The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range from Mackay to south-western Victoria. In NSW the Powerful Owl lives in forests and woodlands occurring in the coastal, escarpment, tablelands and western slopes environments. Specific habitat requirements include eucalypt forests and woodlands on productive sites on gentle terrain; a mosaic of moist and dry types, with mesic gullies and permanent streams; presence of leafy sub-canopy trees or tall shrubs for roosting; presence of large old trees to provide nest hollows. Optimal habitat includes a tall shrub layer and abundant hollows supporting high densities of arboreal marsupials. Roosts in groves of dense mid-canopy trees or tall shrubs in sheltered gullies, typically on wide creek flats and at the heads of minor drainage lines, but also adjacent to cliff faces and below dry waterfalls. Species commonly used for roosting include the She-oaks *Allocasuarina* spp., rainforest species such as Coachwood *Ceratopetalum apetalum*, Lilly Pilly *Acmena smithii* and Sassafras *Doryphora sassafras*, Black Wattle *Acacia melanoxylon*, Turpentine	8	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			Syncarpia glomulifera and eucalypts. Roosting sites are commonly among small groves of up to 2 ha of similar-sized trees with dense foliage in the height range 3-15 m. Nests in old hollow eucalypts in unlogged, unburnt gullies and lower slopes within 100 m of streams or minor drainage lines, with hollows greater than 45 cm diameter and greater than 100 cm deep; surrounded by canopy trees and subcanopy or understorey trees or tall shrubs. Hollow entrances are greater than 6 m above ground, commonly more than 20 m where the forest permits, in trees of at least 80 cm diameter at breast height. During the breeding season, the male Powerful Owl roosts in a "grove" of up to 20-30 trees, situated within 100-200 metres of the nest tree where the female shelters. Nesting occurs from late autumn to mid-winter, but is slightly earlier in north-eastern NSW (late summer – mid autumn). The Powerful Owl is highly sensitive to nest disturbance during the egg and chick stages and will readily abandon the nest if disturbed. Home range has been estimated as 300-1500 ha according to habitat productivity. Moist forest in unlogged corridors in gully systems is used for nesting and roosting, and also preferentially for foraging although much foraging is also conducted in dry and regrowth forest. The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider.				
Numenius madagascariensis Eastern Curlew	-	CE	Within Australia, the Eastern Curlew has a primarily coastal distribution. The species is found in all states, particularly the north, east, and south-east regions including Tasmania. Eastern Curlews are rarely recorded inland. In NSW the species occurs across the entire coast but is mainly found in estuaries such as the Hunter River, Port Stephens, Clarence River, Richmond River and ICOLLs of the south coast. The Eastern Curlew breeds in Russia and north-eastern China but its distribution is poorly known. During the non-breeding season a few birds occur in southern Korea and China, but most spend the non-breeding season in north, east and south-east Australia. It generally occupies coastal lakes, inlets, bays and estuarine habitats, and in	0	Absent	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			New South Wales is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on sandy spits and islets, especially on dry beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves. May also roost on wooden oyster leases or other similar structures The Eastern Curlew is carnivorous, mainly eating crustaceans (including crabs, shrimps and prawns), small molluscs, as well as some insects. The birds may delay breeding until three to four years of age. Within Australia, immature birds, which do not migrate, move northward in winter.				
Oxyura australis Blue-billed Duck	V	-	The Blue-billed Duck is endemic to south-eastern and south-western Australia. It is widespread in NSW, but most common in the southern Murray-Darling Basin area. Birds disperse during the breeding season to deep swamps up to 300 km away. It is generally only during summer or in drier years that they are seen in coastal areas. The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. It will fly if disturbed, but prefers to dive if approached. Blue-billed Ducks will feed by day far from the shore, particularly if dense cover is available in the central parts of the wetland. They feed on the bottom of swamps eating seeds, buds, stems, leaves, fruit and small aquatic insects such as the larvae of midges, caddisflies and dragonflies. Blue-billed Ducks are partly migratory, with short-distance movements between breeding swamps and overwintering lakes with some long-distance dispersal to breed during spring and early summer. Blue-billed Ducks usually nest solitarily in Cumbungi	5	Absent	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			over deep water between September and February. They will also nest in trampled vegetation in Lignum, sedges or Spike-rushes, where a bowl-shaped nest is constructed. The most common clutch size is five or six. Males take no part in nest-building or incubation. Young birds disperse in April-May from their breeding swamps in inland NSW to non-breeding areas on the Murray River system and coastal lakes.				
Pachyptila turtur subantarctica Fairy Prion (southern)		V	The fairy prion (southern) breeds on Macquarie Island and a number of other subantarctic islands outside of Australia. There are 80 to 250 breeding pairs in Australia and a global population of 80 000. In Australia, breeding is recorded on two rock stacks off Macquarie Island and on the nearby Bishop and Clerk Island.	0	Absent	Low	Low
Pandion cristatus Eastern Osprey	V	-	The breeding range of the Eastern Osprey extends around the northern coast of Australia (including many offshore islands) from Albany in Western Australia to Lake Macquarie in NSW. In NSW, the breeding population occurs from the Queensland border (contiguous with the Queensland population) south to Gosford and recently (2005-2007) to Sydney, with a more recent (2008) breeding attempt recorded further south at Ulladulla, where a bird has been observed nest-building (Clancy 2008, 2009). Vagrants occur south to and beyond the Victorian border. Forages over clear estuarine and inshore marine waters and coastal rivers, and nests in tall (usually dead or dead-topped) trees in coastal habitats from open woodland to open forest, within 1-2 km of water. Build a large stick bowl usually in the top of a dead or partly dead tree, from isolated trees in open country to open forest, with prominent emergent perches nearby (*e.g.* dead trees). The species is increasingly seen making use of artificial structures for nest sites and lookout perches (*e.g.* power pylons, towers, bridges) and purpose-built nest platforms on poles. A clutch of usually three eggs is laid in winter, with a single attempt per season.	3	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			The incubation period is about 38 days, the nestling period 9-11 weeks, and the post-fledging dependence period lasts two to three months. Breeding productivity is 0.9-1.1 young per pair per year in NSW. Feed mostly on surface-swimming, schooling fish caught by diving into water. Highly mobile and dispersive.				
Petroica boodang Scarlet Robin	V	-	The Scarlet Robin is found from SE Queensland to SE South Australia and also in Tasmania and SW Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude. The Scarlet Robin is primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees. The Scarlet Robin is a quiet and unobtrusive species which is often quite tame and easily approached. Birds forage from low perches, fence-posts or on the ground, from where they pounce on small insects and other invertebrates which are taken from the ground, or off tree trunks and logs; they sometimes forage in the shrub or canopy layer. Scarlet Robin pairs defend a breeding territory and mainly	1	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			breed between the months of July and January; they may raise two or three broods in each season. This species' nest is an open cup made of plant fibres and cobwebs and is built in the fork of tree usually more than 2 metres above the ground; nests are often found in a dead branch in a live tree, or in a dead tree or shrub. Eggs are pale greenish-, bluish- or brownish-white, spotted with brown; clutch size ranges from one to four. Birds usually occur singly or in pairs, occasionally in small family parties; pairs stay together year-round. In autumn and winter, the Scarlet Robin joins mixed flocks of other small insectivorous birds which forage through dry forests and woodlands.				
Pomatostomus temporalis temporalis Grey-crowned Babbler (eastern subspecies)	V	-	The Grey-crowned Babbler has two distinctive subspecies that intergrade to the south of the Gulf of Carpentaria. West of here the subspecies *rubeculus*, formerly considered a separate species (Red-breasted Babbler) is still widespread and common. The eastern subspecies (*temporalis* occurs from Cape York south through Queensland, NSW and Victoria and formerly to the south east of South Australia. This subspecies also occurs in the Trans-Fly Region in southern New Guinea. In NSW, the eastern sub-species occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. It also occurs in woodlands in the Hunter Valley and in several locations on the north coast of NSW. It may be extinct in the southern, central and New England tablelands. Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions. Flight is laborious so birds prefer to hop to the top of a tree and glide down to the next one. Birds are generally unable to cross large open areas. Live in family groups that consist of a breeding pair and young from previous breeding seasons. A group may consist of up to fifteen birds. All members of the family group remain close to each other when foraging. A soft 'chuck' call	54	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			is made by all birds as a way of keeping in contact with other group members. Feed on invertebrates, either by foraging on the trunks and branches of eucalypts and other woodland trees or on the ground, digging and probing amongst litter and tussock grasses. Build and maintain several conspicuous, dome-shaped stick nests about the size of a football. A nest is used as a dormitory for roosting each night. Nests are usually located in shrubs or sapling eucalypts, although they may be built in the outermost leaves of low branches of large eucalypts. Nests are maintained year round, and old nests are often dismantled to build new ones.				
Ptilinopus regina Rose-crowned Fruit-Dove	V	-	Rose-crowned Fruit-doves are small, colourful rainforest pigeons to 24 cm in length. Coast and ranges of eastern NSW and Queensland, from Newcastle to Cape York. Vagrants are occasionally found further south to Victoria. Rose-crowned Fruit-doves occur mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful. They are shy pigeons, not easy to see amongst the foliage, and are more often heard than seen. They feed entirely on fruit from vines, shrubs, large trees and palms, and are thought to be locally nomadic as they follow the ripening of fruits. Some populations are migratory in response to food availability - numbers in north-east NSW increase during spring and summer then decline in April or May.	1	Marginal	Low	Low
Rostratula australis Australian Painted-snipe	E	E	The Australian Painted Snipe is restricted to Australia. Most records are from the south east, particularly the Murray Darling Basin, with scattered records across northern Australia and historical records from around the Perth region in Western Australia. In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury	1	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			River and the Clarence and lower Hunter Valleys. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves. Breeding is often in response to local conditions; generally occurs from September to December. Incubation and care of young is all undertaken by the male only. Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter.				
Sternula albifrons Little Tern	E	M	Migrating from eastern Asia, the Little Tern is found on the north, east and south-east Australian coasts, from Shark Bay in Western Australia to the Gulf of St Vincent in South Australia. In NSW, it arrives from September to November, occurring mainly north of Sydney, with smaller numbers found south to Victoria. It breeds in spring and summer along the entire east coast from Tasmania to northern Queensland, and is seen until May, with only occasional birds seen in winter months. Almost exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records). Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands. The nest is a scrape in the sand, which may be lined with shell grit, seaweed or small pebbles. Both parents incubate up to three well-camouflaged eggs for up to 22 days, aggressively defending the nest against intruders until the young fledge at 17 - 19 days. Often seen feeding in flocks, foraging for small fish, crustaceans, insects, worms and molluscs by plunging in the shallow water of channels and estuaries, and in the surf on beaches, or skipping over the water surface with a swallow-like flight.	1	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
Stictonetta naevosa Freckled Duck	V	-	The Freckled Duck is found primarily in south-eastern and south-western Australia, occurring as a vagrant elsewhere. It breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. The duck is forced to disperse during extensive inland droughts when wetlands in the Murray River basin provide important habitat. The species may also occur as far as coastal NSW and Victoria during such times. Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds. Generally rest in dense cover during the day, usually in deep water. Feed at dawn and dusk and at night on algae, seeds and vegetative parts of aquatic grasses and sedges and small invertebrates. Nesting usually occurs between October and December but can take place at other times when conditions are favourable. Nests are usually located in dense vegetation at or near water level.	4	Absent	Low	Low
Thinornis rubricollis rubricollis Hooded Plover		V	The hooded plover (eastern) is a small Australian beach nesting bird. It mainly occurs on wide beaches backed by dunes with large amounts of seaweed and jetsam, creek mouths and inlet entrances. Nests are found above the high water mark on flat beaches, on stony terraces, or on sparsely vegetated dunes. As the hooded plover occurs on beaches, it is easily disturbed by human activities, particularly off-leash domestic dogs.	0	Absent	Low	Low
Tyto novaehollandiae Masked Owl	V	-	Extends from the coast where it is most abundant to the western plains. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. Habitat for this species is also widespread throughout the dry eucalypt forests of the tablelands, western slopes and the undulating wet-dry forests of the coast.	10	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			Optimal habitat includes an open understorey and a mosaic of sparse (grassy) and dense (shrubby) ground cover on gentle terrain. Roosts in hollows in live or occasionally dead eucalypts; dense foliage in gullies; and caves. Nest in old hollow eucalypts, live or dead, in a variety of topographic positions, with hollows greater than 40 cm wide and greater than 100 cm deep. Hollow entrances are at least 3 m above ground, in trees of at least 90 cm diameter at breast height. A specialist predator of terrestrial mammals, particularly native rodents. Home range has been estimated as 400-1000 ha according to habitat productivity.				
Mammalia							
Chalinolobus dwyeri Large-eared Pied Bat	V	V	Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Hirundo arie*l), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves. Found in well-timbered areas containing gullies. This species probably forages for small, flying insects below the forest canopy. Likely to hibernate through the coolest months. It is uncertain whether mating occurs early in winter or in spring.	2	Absent	Low	Low
Dasyurus maculatus Spotted-tailed Quoll	V	E	The range of the Spotted-tailed Quoll has contracted considerably since European settlement. It is now found in eastern NSW, eastern Victoria, south-east and north-eastern Queensland, and Tasmania. Only in Tasmania is it still considered relatively common. Recorded across a range of habitat types,	10	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Mostly nocturnal, although will hunt during the day; spends most of the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds. Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals. A generalist predator with a preference for medium-sized (500g-5kg) mammals. Consumes a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits, reptiles and insects. Also eats carrion and takes domestic fowl. Females occupy home ranges up to about 750 hectares and males up to 3500 hectares. Are known to traverse their home ranges along densely vegetated creeklines. Average litter size is five; both sexes mature at about one year of age. Life expectancy in the wild is about 3-4 years.				
Falsistrellus tasmaniensis Eastern False Pipistrelle	V	-	The Eastern False Pipistrelle is found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania. Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. Hunts beetles, moths, weevils and other flying insects above or just below the tree canopy. Hibernates in winter. Females are pregnant in late spring to early summer.	27	Marginal	Low	Low
Miniopterus australis	V	-	Moist eucalypt forest, rainforest or dense coastal banksia scrub. Little Bentwing-bats roost in caves, tunnels and sometimes tree hollows during the day, and at night forage for small insects beneath the canopy of densely	73	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
Little Bentwing-bat			vegetated habitats. They often share roosting sites with the Common Bentwing-bat and, in winter, the two species may form mixed clusters. In NSW the largest maternity colony is in close association with a large maternity colony of Common Bentwing-bats (*M. schreibersii*) and appears to depend on the large colony to provide the high temperatures needed to rear its young.				
Miniopterus orianae oceanensis Large Bent-winged Bat	V	-	Large Bent-wing Bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia. Breeding or roosting colonies can number from 100 to 150,000 individuals. Hunt in forested areas, catching moths and other flying insects above the tree tops.	58	Marginal	Low	Low
Micronomus norfolkensis Eastern Coastal Free-tailed Bat	V	-	The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW. Occurs in dry sclerophyll forest and woodland east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures. Usually solitary but also recorded roosting communally. Is insectivorous.	57	Marginal	Low	Low
Myotis macropus Southern Myotis	V	-	The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage	28	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			over streams and pools catching insects and small fish by raking their feet across the water surface. In NSW females have one young each year usually in November or December.				
Petauroides volans Greater Glider	-	V	Arboreal nocturnal marsupial, largely restricted to eucalypt forests and woodlands. It is primarily folivorous, with a diet mostly comprising eucalypt leaves, and occasionally flowers. It is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. Favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species. Found in Eucalypt-dominated low open forests on coast to tall forests in the ranges and low woodland west of Great Dividing Range; not in rainforests. Found along the east coast of Australia.	2	Absent	Low	Low
Petaurus norfolcensis Squirrel Glider	V	-	The species is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey. Live in family groups of a single adult male one or more adult females and offspring. Require abundant tree hollows for refuge and nest sites. Diet varies seasonally and consists of *Acacia* gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.	46	Marginal	Moderate – records nearby	Moderate
Petrogale penicillata Brush-tailed Rock-wallaby	E	V	The range of the Brush-tailed Rock-wallaby extends from south-east Queensland to the Grampians in western Victoria, roughly following the line of the Great Dividing Range. However the distribution of the species across its original range has declined significantly in the west and south and has become more fragmented. In NSW they occur from the Queensland border in the north to the Shoalhaven in the south, with the population in the	0	Absent	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			Warrumbungle Ranges being the western limit. Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. Shelter or bask during the day in rock crevices, caves and overhangs and are most active at night when foraging. Browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees. Highly territorial and have strong site fidelity with an average home range size of about 15 ha. Males tend to have larger home ranges than females. The home range consists of a refuge area and a foraging range linked by habitually used commuting routes. Females settle in or near their mother's range, while males mainly disperse between female groups within colonies, and less commonly between colonies. Dominant males associate and breed with multiple females. Breeding occurs throughout the year with a peak in births between February and May, especially in the southern parts of the range and at higher altitudes.				
Phascogale tapoatafa Brush-tailed Phascogale	V	-	The Brush-tailed Phascogale has a patchy distribution around the coast of Australia. In NSW it is mainly found east of the Great Dividing Range although there are occasional records west of the divide. Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater. Feeds mostly on arthropods but will also eat other invertebrates, nectar and sometimes small vertebrates. Females have exclusive territories of approximately 20 - 40 ha, while males have overlapping territories often greater than 100 ha. Nest and shelter in tree hollows with entrances 2.5 - 4 cm wide and use many different hollows over a short time span. Mating occurs May - July; males die soon after the mating season whereas females can live for up to three years but generally only produce one litter.	15	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
Phascolarctos cinereus Koala	V	V	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In New South Wales, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range. Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Inactive for most of the day, feeding and moving mostly at night. Spend most of their time in trees, but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. Generally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery. Females breed at two years of age and produce one young per year.	11	Marginal – koala feed trees present but does not qualify as core koala habitat	Low – no evidence of koalas or recent nearby records	Low
Potorous tridactylus tridactylus Long-nosed Potoroo	V	V	In NSW it is generally restricted to the east of the Great Dividing Range, with an annual rainfall exceeding 760 mm. Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature. The main habitat requirements would appear to be access to some form of dense vegetation for shelter and the presence of an abundant supply of fungi for food. The fruit-bodies of hypogeous (underground-fruiting) fungi are a large component of the diet of the Long-nosed Potoroo. They also eat roots, tubers, insects and their larvae and other soft-bodied animals in the soil. Individuals are mainly solitary, non-territorial	0	Absent	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			and have home range sizes ranging between 2-5 ha. Breeding peaks typically occur in late winter to early summer.				
Pseudomys novaehollandiae New Holland Mouse	-	V	The New Holland Mouse has a fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Genetic evidence indicates that the New Holland Mouse once formed a single continuous population on mainland Australia and the distribution of recent subfossils further suggest that the species has undergone a large range contraction since European settlement. Total population size of mature individuals is now estimated to be less than 10,000 individuals although, given the number of sites from which the species is known to have disappeared between 1999 and 2009, it is likely that the species' distribution is actually smaller than current estimates. Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes. It is a social animal, living predominantly in burrows shared with other individuals. Distribution is patchy in time and space, with peaks in abundance during early to mid stages of vegetation succession typically induced by fire.	0	Marginal	Low	Low
Pteropus poliocephalus Grey-headed Flying-fox	V	V	Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of natural resource shortages, they may be found in unusual locations. Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young. Annual mating commences in January and conception occurs in April or May; a single young is born in October or November. Site fidelity	245	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			to camps is high; some camps have been used for over a century. Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km. Feed on the nectar and pollen of native trees, in particular *Eucalyptus, Melaleuca* and *Banksia*, and fruits of rainforest trees and vines. Also forage in cultivated gardens and fruit crops.				
Saccolaimus flaviventris Yellow-bellied Sheathtail-bat	V	-	The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. In the most southerly part of its range - most of Victoria, south-western NSW and adjacent South Australia - it is a rare visitor in late summer and autumn. There are scattered records of this species across the New England Tablelands and North West Slopes. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Breeding has been recorded from December to mid-March, when a single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn.	8	Marginal	Low	Low
Scoteanax rueppellii Greater Broad-nosed Bat	V	-	The Greater Broad-nosed Bat is found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast over much of its range. In NSW it is widespread on the New England Tablelands, however does not occur at altitudes above 500 m. Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open	30	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species. Little is known of its reproductive cycle, however a single young is born in January; prior to birth, females congregate at maternity sites located in suitable trees, where they appear to exclude males during the birth and raising of the single young.				
Vespadelus troughtoni Eastern Cave Bat	V	-	The Eastern Cave Bat is found in a broad band on both sides of the Great Dividing Range from Cape York to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT. Very little is known about the biology of this uncommon species. A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals. Occasionally found along cliff-lines in wet eucalypt forest and rainforest. Little is understood of its feeding or breeding requirements or behaviour.	5	Absent	Low	Low
Amphibians							
Heleioporus australiacus Giant Burrowing Frog	V	V	The Giant Burrowing Frog occurs from the NSW Central Coast to eastern Victoria, but is most common on the Sydney sandstone. It has been found from the coast to the Great Dividing Range. Found in heath, woodland and open forest with sandy soils. Generally lives in the heath or forest and will travel several hundred metres to creeks to breed. Burrows into deep litter or loose soil, emerging to feed or breed after rain. Diet includes ground-dwelling invertebrates such as ants, beetles and spiders. Breeds from August to March	0	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			and the eggs are laid in a white foam-mass under vegetation in creeks or in yabby holes.				
Litoria aurea Green and Golden Bell Frog	E	V	Its former distribution was predominantly coastal but extended inland to the central and southern tablelands, including Bathurst in the west. It was known from the northern coastal part of NSW from around Brunswick Heads south along the entire NSW coast extending into the north-eastern portion of Victoria. There are presently 43 identified remaining key populations, most of which have a small fragmented distribution of mainly near coastal locations. Large populations in NSW are located around the metropolitan areas of Sydney, Shoalhaven and mid north coast. There is only one known population on the NSW Southern Tablelands. Inhabits marshes, dams and stream-sides, particularly those containing Typha (Typha spp.) or spikerushes (Eleocharis spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (Gambusia holbrooki), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas. The species is active by day and usually breeds in summer when conditions are warm and wet. Tadpoles feed on algae and other plant-matter; adults eat mainly insects, but also other frogs. Preyed upon by various wading birds and snakes.	8	Marginal	Low	Low
Litoria littlejohni Littlejohn's Tree Frog	V	V	Occurs in scattered locations between the Watagan Mountains in eastern New South Wales and Buchan in north-east Victoria. It occurs within the Hunter-Central Rivers, Southern Rivers (NSW) and East Gippsland (Victoria) Natural Resource Management Regions. Inhabits forest, coastal woodland and heath from 100 to 950 m above sea level, but is not associated with any specific vegetation types. This species breeds in the upper reaches of permanent streams and in perched swamps. Non-breeding habitat is heath	1	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			based forests and woodlands where it shelters under leaf litter and low vegetation, and hunts for invertebrate prey either in shrubs or on the ground. Breeding is triggered by heavy rain and can potentially occur all year, but is usually from late summer to early spring. Eggs and tadpoles are mostly found in still or slow flowing pools that receive extended exposure to sunlight, but will also use temporary isolated pools.				
Mixophyes balbus Stuttering Frog	E	V	Stuttering Barred Frogs occur along the east coast of Australia from southern Queensland to the north-eastern Victoria. The species has suffered a marked decline in distribution and abundance, particularly in south-east NSW. It is the only *Mixophyes* species that occurs in south-east NSW and in recent surveys it has only been recorded at three locations south of Sydney. Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor. Feed on insects and smaller frogs. Breed in streams during summer after heavy rain. Eggs are laid on rock shelves or shallow riffles in small, flowing streams. As the tadpoles grow they move to deep permanent pools and take approximately 12 months to metamorphose.	0	Absent	Low	Low
Mixophyes iteratus Giant Barred Frog	E	E	The Giant Barred Frog is distributed along the coast and ranges from Eumundi in south-east Queensland to Warrimoo in the Blue Mountains. Declines appear to have occurred at the margins of the species' range, with no recent records south of the Hawkesbury River and disappearances from a number of streams in QLD. Northern NSW, particularly the Coffs Harbour-Dorrigo area, is a stronghold. Giant Barred Frogs are found along freshwater streams with permanent or semi-permanent water, generally (but not always) at lower elevation. Moist riparian habitats such as rainforest or wet sclerophyll forest are favoured for the deep leaf litter that they provide for	0	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			shelter and foraging, as well as open perching sites on the forest floor. However, Giant Barred Frogs will also sometimes occur in other riparian habitats, such as those in drier forest or degraded riparian remnants, and even occasionally around dams. Breeding takes place from late spring to summer. Once eggs are laid and fertilised in the water, the female kicks them out of the water where they stick onto a suitable bank (e.g. overhanging or steeply sloped). Hatchlings drop or wriggle into the water. Tadpoles grow to about 11cm and it may take up to 14 months between egg laying and the completion of metamorphosis. Although generally found within about 20m of the stream, outside the breeding season, the Giant Barred Frog may disperse away from the stream (e.g. 50m or further). It is a generalist feeder, with large insects, snails, spiders and frogs included in its diet.				
Insects							
Synemon plana Golden Sun Moth	E	CE	The Golden Sun Moth is a medium-sized, day-flying (diurnal) moth. The Golden Sun Moth's NSW populations are found in the area between Queanbeyan, Gunning, Young and Tumut. The species' historical distribution extended from Bathurst (central NSW) through the NSW Southern Tablelands, through to central and western Victoria, to Bordertown in eastern South Australia. Occurs in Natural Temperate Grasslands and grassy Box-Gum Woodlands in which groundlayer is dominated by wallaby grasses *Austrodanthonia* spp. Grasslands dominated by wallaby grasses are typically low and open - the bare ground between the tussocks is thought to be an important microhabitat feature for the Golden Sun Moth, as it is typically these areas on which the females are observed displaying to attract males. Habitat may contain several wallaby grass species, which are typically associated with other grasses particularly spear-grasses *Austrostipa* spp. or Kangaroo Grass *Themeda australis*. Adults are short-lived (one to four days)	0	Absent	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			and do not feed - having no functional mouthparts; the larvae are thought to feed exclusively on the roots of wallaby grasses. Males spend their entire adult life patrolling the grassland in search of females; once mated, the females spend their time laying eggs at the bases of wallaby grass tussocks. The flight period is relatively short, typically lasting from six to eight weeks (during November and December in the ACT region, possibly earlier or later in other regions). Males fly only in bright sunshine during the warmest part of the day (1000 - 1400 hrs). Adults emerge continuously throughout the flying season. Larvae feed on the roots of the wallaby grass plant. The larval development time (and thus generation time) is unknown - it possibly varies between one and three years.				
Reptiles							
Delma impar Striped Legless Lizard	V	V	The Striped Legless Lizard occurs in the Southern Tablelands, the South West Slopes, the Upper Hunter and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma, Muswellbrook and Tumut areas. Also occurs in the ACT, Victoria and south-eastern South Australia. Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Also found in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland. Habitat is where grassland is dominated by perennial, tussock-forming grasses such as Kangaroo Grass *Themeda australis*, spear-grasses *Austrostipa* spp. and poa tussocks *Poa* spp., and occasionally wallaby grasses *Austrodanthonia* spp. Sometimes present in modified grasslands with a significant content of exotic grasses. Sometimes found in grasslands with significant amounts of surface rocks, which are used for shelter. Actively hunts for spiders, crickets, moth larvae and cockroaches. Two papery eggs	0	Absent	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			are laid in early summer. Goes below ground or under rocks or logs over winter.				
Migratory Species							
Cuculus optatus Oriental Cuckoo		M	A regular migrant to Australia, where it spends the non-breeding season (Sept- May) in coastal regions across northern and eastern Australia as well as offshore islands. The species uses a range of vegetated habitats such as monsoon rainforest, wet sclerophyll forest, open woodlands and appears quite often along edges of forests, or ecotones between forest types. This cuckoo feeds arboreally, foraging for invertebrates on loose bark on the trunks and branches of trees, and among the foliage, including in mistletoes. It will forage from the ground, but requires shrubs or trees from which it sallies and returns to consume prey items. Caterpillars are a favoured food item. In NSW it occurs from northern border south to Newcastle, mainly in coastal areas, but inland as far as Armidale and Apsley River.	0	Marginal	Low	Low
Monarcha melanopsis Black-faced Monarch		M	The Black-faced Monarch is found along the coast of eastern Australia, becoming less common further south. The Black-faced Monarch is found in rainforests, eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating. Resident in the north of its range, but is a summer breeding migrant to coastal south-eastern Australia, arriving in September and returning northwards in March. The Black-faced Monarch forages for insects among foliage, or catches flying insects on the wing. The Black-faced Monarch builds a deep cup nest of casuarina needles, bark, roots, moss and spider web in the fork of a tree, about 3 m to 6 m above the ground. Only the female builds the nest, but both sexes incubate the eggs and feed the young.	0	Marginal	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
Monarcha trivirgatus Spectacled Monarch		M	Spectacled Monarchs are largely confined to the north east and east coastal and near coastal regions of Australia. The nest is usually built in a vertical fork of a tree, sapling or shrub, and an association with water courses has been noted. Nests are deep and cup-shaped, but vary in overall shape depending on the nest location. In NSW occurs along coast and eastern slopes of Great Dividing Range to northern Hunter Region. Occasional records further south at sites around Newcastle, Central Coast and Sydney.	0	Marginal	Low	Low
Motacilla flava Yellow Wagtail		M	The Yellow Wagtail is a regular wet season visitor to northern Australia. Increasing records in NSW suggest this species is an occasional but regular summer visitor to the Hunter River region. The species is considered a vagrant to Victoria, South Australia and southern Western Australia. Habitat requirements for the Yellow Wagtail are highly variable, but typically include open grassy flats near water. Habitats include open areas with low vegetation such as grasslands, airstrips, pastures, sports fields; damp open areas such as muddy or grassy edges of wetlands, rivers, irrigated farmland, dams, waterholes; sewage farms, sometimes utilise tidal mudflats and edges of mangroves.	0	Marginal	Low	Low
Myiagra cyanoleuca Satin Flycatcher		M	The Satin Flycatcher is found along the east coast of Australia from far northern Queensland to Tasmania, including south-eastern South Australia. It is also found in New Guinea. The Satin Flycatcher is not a commonly seen species, especially in the far south of its range, where it is a summer breeding migrant. The Satin Flycatcher is found in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests. The Satin Flycatcher is a migratory species, moving northwards in winter to northern Queensland and Papua New Guinea, returning south to breed in spring. The	0	Absent	Low	Low

Species	BC Act	EPBC Act	Description of habitat	No. of records within 10km (BioNet)	Presence of habitat	Likelihood of occurrence	Possible impact?
			Satin Flycatcher takes insects on the wing, foraging actively from perches in the mid to upper canopy.				
Rhipidura rufifrons Rufous Fantail		M	The Rufous Fantail is found in northern and eastern coastal Australia, being more common in the north. It is also found in New Guinea, the Solomon Islands, Sulawesi and Guam. The Rufous Fantail is found in rainforest, dense wet forests, swamp woodlands and mangroves, preferring deep shade, and is often seen close to the ground. During migration, it may be found in more open habitats or urban areas. Strongly migratory in the south of its range, it moves northwards in winter, and virtually disappears from Victoria and New South Wales at this time. The Rufous Fantail feeds on insects, which it gleans from the middle and lower levels of the canopy. It is a very active feeder and constantly fans tail and flicks wings and body while foraging. The Rufous Fantail builds a small compact cup nest, of fine grasses bound with spider webs, that is suspended from a tree fork about 5 m from the ground. The bottom of the nest is drawn out into a long stem.	0	Absent	Low	Low

APPENDIX D TEST OF SIGNIFICANCE (BC ACT)

Under section 7.3 the *Biodiversity Conservation Act 2016* (BC Act), the threatened species 'Test of Significance' is used to determine if a development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. It is sometimes also referred to as the '5-part test'. One (1) ToS was carried out for the purposes of this assessment for the following species:

- Squirrel Glider - *Petaurus norfolcensis* (BC Act – Vulnerable)

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

A likely *Petaurus* spp. scat was found in the reserve to the south-west of the development site. There will be no impacts to this area. The scat may belong to a Squirrel Glider, which have been observed nearby in 2018. Squirrel Gliders require multiple hollows for refuge and nest sites, prefers mixed species stands with a shrub or Acacia midstorey.

A maximum of 0.17 ha of native vegetation would be removed by the proposal. This may marginally reduce potential foraging habitat for the Squirrel Glider, however they are more likely to rely on contiguous habitat along Two Mile Creek. No hollow-bearing trees would be impacted by the proposal. Considering that there would be no impacts to breeding habitat, the removal of 0.17 ha of marginal foraging habitat is unlikely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

Not applicable.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Not applicable.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

A maximum of 0.17 ha of low to moderate condition native vegetation within landscaped garden settings would be removed by the proposal. No hollow-bearing trees would be impacted.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

The proposal will marginally decrease the amount of foraging habitat available, however potential breeding and refuge habitat along Two Mile Creek would not become further fragmented or isolated from other

areas of habitat. The study area is located within an urban landscape and is already subject to fragmentation and edge effects.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

Five hollow-bearing trees that have the potential to provide nesting and refuge habitat were recorded within the study area. None of these trees would be removed as part of the proposal. 0.17 ha of edge habitat with a mixture of native and exotic trees would be removed, however this habitat is unlikely to be important to the long-term survival of Squirrel Gliders in the locality. No keystone nectar food trees (DEC 2004) would be removed within the proposal site

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

No areas of outstanding biodiversity value are present within the study area or locality. There are also no priority management sites within the locality.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

Six Key Threatening Processes (KTPs) are relevant to the proposed works including:

- Clearing of native vegetation
- Invasion of native plant communities by exotic perennial grasses
- Invasion, establishment and spread of Lantana
- Infection of native plants by Phytophthora cinnamomi

The clearing of native vegetation is considered a major contributor to the loss of biodiversity. In the determination, the NSW Scientific Committee found that 'clearing of any area of native vegetation, including areas less than two hectares in extent, may have significant impacts on biological diversity'. A maximum of 0.17 ha of low to moderate condition native vegetation would be removed as a result of the proposal and would contribute to the KTP.

No stags and no areas with logs/course woody debris would also be removed as a result of the proposed works.

Provided the suggested safeguards and mitigation measures including weed management and soil hygiene measures are adhered to during the proposed works, the proposal would not contribute to the invasion of weeds and Phytophthora KTPs.

Conclusion

The proposal will remove a maximum of 0.17 ha of low-quality Squirrel Glider foraging habitat. Given the modified nature of vegetation within the proposal area compared to higher-quality habitat along Two Mile Creek, its removal is unlikely to reduce the long-term viability of the species or accelerate its extinction. As such, the impacts to Squirrel Gliders as a result of the proposal are not considered significant.