

Biodiversity Impact Assessment

FROGS HOLLOW RECREATIONAL FLIGHT SCHOOL



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CONTENTS

ACRONYMS AND ABBREVIATIONS	I
1 INTRODUCTION.....	1
1.1 PROPOSAL DESCRIPTION.....	1
1.2 AIM OF THIS REPORT.....	1
2 ASSESSMENT PATHWAY	1
3 METHODOLOGY	1
3.1 DATABASE SEARCHES.....	1
3.2 SITE INSPECTION	1
3.3 LIMITATIONS ON THIS ASSESSMENT.....	2
4 RESULTS.....	2
4.1 DATABASE SEARCHES.....	2
4.2 FLORA.....	3
4.2.1 Vegetation communities	3
4.2.2 Threatened ecological communities.....	4
4.2.3 Threatened flora	5
4.2.4 Significant vegetation	5
4.3 FAUNA.....	5
4.3.1 Fauna habitats	5
4.3.2 Threatened fauna species.....	5
5 ASSESSMENT OF IMPACTS	8
5.1 IMPACTS OF THE DEVELOPMENT.....	8
5.2 THREATENED COMMUNITIES.....	9
5.3 THREATENED FLORA SPECIES.....	10
5.4 THREATENED FAUNA SPECIES.....	10
6 RECOMMENDATIONS	11
7 CONCLUSION	13
8 REFERENCES.....	14
APPENDIX A THREATENED SPECIES HABITAT EVALUATIONS	A-I
APPENDIX B FLORA SPECIES LISTS.....	B-I
APPENDIX C SEVEN-PART TEST	C-I

FIGURES

Figure 4-1 Vegetation communities occurring at the proposal site7

TABLES

Table 3-1 Native vegetation within the site boundaries.....5

ACRONYMS AND ABBREVIATIONS

BC Act	<i>Biodiversity Conservation Act 2016</i>
CMA	Catchment Management Authority
Cwth	Commonwealth
DP	Development Plan
EEC	Endangered ecological community
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i> (Cwth)
ha	hectares
km	kilometres
m	Metres
NSW	New South Wales
OEH	(NSW) Office of Environment and Heritage, formerly Department of Environment, Climate Change and Water
sp/spp	Species/multiple species
TSC Act	<i>Threatened Species Conservation Act 1995</i>

1 INTRODUCTION

This Biodiversity Impact assessment has been prepared by NGH Environmental on behalf of Norm Boyle, to consider the potential flora and fauna impacts associated with a proposed development at Lot 1 DP109606, 1070 Princess Highway, Frogs Hollow NSW.

1.1 PROPOSAL DESCRIPTION

The property is located at Lot 1 DP109606 1070 Princess Highway, Frogs Hollow NSW, approximately 10km south of Bega. The proposal involves the development of a recreational flight school. The property is currently used as a recreational flight facility.

The proposed development would include:

- The construction of 10 x separate squadron units, each with a footprint of approximately 2250m² (30m x 75m). Each unit will be of single storey construction and provide accommodation for 12 people
- The construction of 10 x single storey hangers with an approximate footprint of 416m² (52m x 8m)
- The construction of 1 x single storey showroom/ office
- The construction of 2 x small one storey buildings for the maintenance of planes.

Additional ancillary elements would include:

- Car parking spaces, water tanks and treatment plant, aviation fuel tanks
- No work is proposed to the existing airstrip
- Construction of a bridge over an existing gully and extension of an existing road. All roads will be sealed with bitumen to Council's Engineering standard
- Other components necessary for day to day operations.

1.2 AIM OF THIS REPORT

The aim of this report is to make an assessment of the native flora and fauna values within the site and to consider any potential impacts on these values as a consequence of the development. The report considers the types and condition states of the vegetation communities present, the presence of habitat for NSW and Commonwealth listed threatened flora and fauna species and ecological communities that may be adversely affected by the proposal.

2 ASSESSMENT PATHWAY

Two assessment pathways are currently available to the project:

1. The incoming Biodiversity Conservation Act
2. The outgoing Threatened Species Conservation Act 1995

Under the new Biodiversity Conservation Act, relevant triggers were investigated, as follows:

- 'Sensitive biodiversity values' – the site is not mapped as 'Sensitive biodiversity values' under the new act.
- The site is between 1-40 ha in total *and* more than 0.5 ha clearing of native vegetation is proposed - a 'Threshold test of significance' (5 pt test) is not appropriate.
- The site is between 1-40 ha in total *and* more than 2 ha clearing of native vegetation is proposed - a 'Stream-lined assessment approach' is not appropriate.

Under the new BC Act, the proposed development would require a Biodiversity Development Assessment Report (BDAR) to determine the quantum of offsets required for clearing. Offsets are likely to be required.

A transitional period for Part 4 assessments extends until 25 November 2017 however. Currently, for this development type under the *Threatened Species Conservation Act 1995* offsets are voluntary (unless deemed to be required by Council). An 'Assessment of significance' (7 part test; pursuant to the *Threatened Species Conservation Act 1995*) for the clearing proposed is required to demonstrate whether impacts would be significant. In such cases, offsetting is not usually required.

The following flora and fauna report has been prepared under the transitional arrangements for Part 4 assessments with reference to the *Threatened Species Conservation Act 1995*. This report characterises the significance of impacts to threatened entities and provides mitigation measures to manage biodiversity impacts.

3 METHODOLOGY

3.1 DATABASE SEARCHES

Database searches were undertaken on 9 September 2017, to identify the threatened species, ecological communities and endangered populations known, or potentially occurring, within the locality, based on previous records. Database records searched included:

- Office of Environment and Heritage (OEH) Wildlife Atlas database for threatened flora and fauna species and population, and ecological communities, recorded within a defined search of the proposed development with a 10km² buffer.
- Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Protected Matters Search Tool, utilising a 5km buffer from the centre of the proposal site.

3.2 SITE INSPECTION

An inspection of the site was conducted on the 11th of September 2017 by an ecologist and technical assistant, over a period of approximately 3 person hours.

The survey concentrated on identifying the native vegetation within the site boundaries and the road leading to the proposed site. Targeted surveys were conducted for threatened ecological communities and threatened flora species that were present onsite. As the seasonal timing in early spring was not ideal for identifying all native plant species, the primary focus of the assessment was to identify the vegetation communities present, signs of threatened species visible in winter, and to assess the potential habitat for threatened flora and fauna provided by any remnant native grassy vegetation and other habitat features. A list of plant species was recorded during the site inspection to provide some detail of the flora present, to help categorise and describe each vegetation community and to aid in identifying the presence of any threatened species.

The fauna survey involved identifying the types of fauna habitat available within the proposed site including important habitat features as well as incidental fauna sightings. No targeted surveys were undertaken. As the survey was a very brief snapshot, many fauna species potentially using the site will not have been detected. The assessment of potential occurrence of threatened fauna species therefore relies heavily on the presence of suitable habitat features, such as hollow-bearing trees and favoured food sources for species known to occur in the region.

3.3 LIMITATIONS ON THIS ASSESSMENT

Detailed flora species lists for each vegetation community identified and targeted surveys for listed threatened flora species were not undertaken, as the assessment was conducted in winter when many native flora species might not be detectable.

The assessment focused primarily on the identification of the vegetation communities and their condition states, and whether any conform with listed Endangered Ecological Communities (EEC). This information was also used as an indicator of the potential presence of listed threatened flora and fauna species based on the habitat provided by the vegetation and other landscape features.

4 RESULTS

4.1 DATABASE SEARCHES

The database searches of listed threatened species and ecological communities known to occur within the region found numerous listed entities potentially occurring within the site. However, the searches are necessarily broad in scope and many of these entities may not be present on the site or in the locality.

The NSW OEH Wildlife Atlas search returned:

- 12 ecological communities
- 1 flora species
- 3 birds
- 7 mammals

The EPBC Act Protected Matters Search returned:

- 1 ecological communities
- 4 flora species
- 3 amphibians

- 8 birds
- 1 fish
- 8 mammals

The species identified by the searches are included in the Threatened Species Habitat Evaluations, Appendix A. Listed ecological communities and species with potential to occur are discussed below and in Section 5 (impact assessment).

4.2 FLORA

4.2.1 Vegetation communities

The proposed recreational flight school site has a disturbance history that has degraded the diversity. The vegetation communities present are regularly grazed by cattle that has affected the composition and includes patches of dense exotic grassland.

The dominate vegetation found on the site consists of three broad communities:

1. Lowland grassy woodland – with tree cover
2. Lowland grassy woodland – without tree cover
3. Exotic dominated

In these areas, Lowland grassy woodland (tree cover) and Lowland grassy woodland (without tree cover) are in moderate to good condition whilst the exotic dominate is no longer considered native vegetation.

The above vegetation communities are mapped in Figure 4-1 and detailed below. A list of the plant species identified onsite is provided in Appendix B.1.

Lowland grassy woodland – tree cover

The Lowland grassy woodland (tree cover) community is dominated by Rough-barked Apple (*Angophora floribunda*) with occasional Broad-leaved Peppermint (*Eucalyptus dives*) and Forest Red Gum (*Eucalyptus tereticornis*).

The ground layer contains very low native species diversity with species present including Weeping Grass (*Microlaena stipoides*), Red Grass (*Bothriochloa macra*), Bracken (*Pteridium esculentum*) and an occasional native forb such as *Dichondra repens* and the small twiner *Glycine clandestina*. There was little to no shrub layer present with the small tree Black Wattle (*Acacia mearnsii*) being the single species identified.

Numerous exotic species were recorded during the field survey, with exotic cover consisting of species such as Parramatta Grass (**Sporobolus africanus*), African Lovegrass (**Eragrostis curvula*), Rat's Tail Fescue (**Vulpia spp.*), clovers (**Trifolium spp.*) and the weed Flatweed (**Hypochaeris radicata*).

Lowland grassy woodland – without tree cover

The Lowland grassy woodland (without tree cover community) is much the same as the Lowland grassy woodland (tree cover) community. Native grasses identifiable within the areas consisted of Weeping Grass (*M. stipoides*) and Red Grass (*B. macra*). The whole site is regularly grazed by cattle and the composition of the grassland has been substantially affected by this.

A number of exotics were recorded including Parramatta Grass (**S. africanus*), African Lovegrass (**E. curvula*), Rat's Tail Fescue (**V. spp.*) and Flatweed (**H. radicata*) and various other exotic forbs. The high diversity of exotic vegetation suggest that the groundcover is of low native diversity.

Exotic dominated

The exotic vegetated areas are predominately dense infestations of African Lovegrass (**E. curvula*), with a mixture of exotic and native grasses, however almost entirely exotic forbs and African Lovegrass.

In these areas, the noxious weed African Lovegrass (**E. curvula*) has substantially invaded the native pasture and is now dominant. As the area is no longer considered to be native vegetation, there is no recovery potential under the existing management regime.

4.2.2 Threatened ecological communities

The Lowland grassy woodland (without tree cover) is not a listed threatened ecological community under the NSW TSC Act or the Commonwealth EPBC Act in light of its very low native species diversity and apparent absence of native forbs.

The Lowland grassy woodland (tree cover) vegetation community was found to satisfy the NSW scientific communities determination of the *Biodiversity Conservation 2016* Act listed Endangered Ecological Community *Lowland Grassy Woodland in the South East Corner Bioregion*.

Lowland Grassy Woodland is also listed federally under the *Environment Protection and Biodiversity Conservation Act 1999*, as a Critically Endangered Ecological Community. However, this listing applies only to stands in good condition, and to meet the listing criteria a stand must:

- Be woodland or derived native grassland with a high native species diversity and be 0.25 hectares or more in size, or
- Be less diverse woodland or grassland and be 2 hectares or more in size; and
- Have more than 50% of the total understorey species native, and
- If of lower diversity but >2 hectares in size, have at least 10 native species from a list of indicator species (15 species for better remnants), and
- Be contiguous with other native vegetation of at least 5 hectares in area, or
- Have large old trees of >80 cm diameter or with hollows at the density of one tree per hectare.

Stands which do not fit these criteria are not considered to be part of the EPBC Act listing. The community in the south western corner of the site may satisfy the criteria for the EPBC Act listing, although part of this community is outside of the proposed site. However, as no development is proposed for this area, further survey to determine if the community meets the EPBC Act criteria is not required.

Table 3-1 Native vegetation within the site boundaries

Vegetation type (and status)	Area (ha)
Lowland grassy woodland – with tree cover (NSW EEC)	10.82
Lowland grassy woodland – without tree cover (not EEC)	40.73
Exotic dominated (not native)	4.43
Total	55.98

4.2.3 Threatened flora

It is likely that the assessment area has experienced a long history of livestock grazing for numerous years resulting in the clearing of overstorey and shrub layers within the development site. Additionally, the use of the site as an airstrip has caused a degree of ground disturbance.

The area to be directly impacted by the proposed development provides little if any suitable habitat for any of the threatened flora species highlighted by the threatened entities database search. No threatened flora species were found to be present on the subject site during the site visit, nor are any considered at all likely to occur. The habitat evaluation in Appendix B indicates that the habitat on the site is not suitable for any of the species known to occur in the region.

4.2.4 Significant vegetation

Broad-leaved Peppermint (*Eucalyptus dives*) trees were found to be scattered within the woodland. This tree species is regionally uncommon, being known on the south coast only from a small area south and west from Bega. Its presence on the south coast is of some scientific interest. The location of this species onsite is also mapped on Figure 4-1.

4.3 FAUNA

4.3.1 Fauna habitats

Fauna habitat features identified on the site include:

- **Woodland habitat:** The woodland habitat could provide good habitat for birds, small mammals and reptiles.
- **Grassland habitat:** The grassland at the site could provide some habitat for reptiles, birds and insects.
- **Hollow bearing trees:** The hollows at the site could provide some habitat for birds and small mammals.

4.3.2 Threatened fauna species

Lowland grass woodland (woodland and grassland)

The woodland area could provide potential habitat for birds and small mammals. The mix of tree species and ages, older trees, structures of shrubs and fallen timber provide potentially good habitat complexity and food and shelter resources for the following threatened fauna species:

- Spotted Harrier (*Circus assimilis*)
- Little Eagle (*Hieraaetus morphnoides*)
- Gang Gang Cockatoo (*Callocephalon fimbriatum*)
- Little Lorikeet (*Glossopsitta pusilla*)
- Swift Parrot (*Lathamus discolor*)
- Turquoise Parrot (*Neophema pulchella*)
- Masked Owl (*Tyto novaehollandiae*)
- Barking Owl (*Ninox connivens*)
- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)
- Varied Sitella (*Daphoenositta chrysoptera*)
- Scarlet Robin (*Petroica boodang*)
- Diamond Firetail (*Stagonopleura guttata*)
- Grey-headed Flying-fox (*Pteropus poliocephalus*)
- Eastern Freetail-bat (*Mormopterus norfolkensis*)
- Greater Broad-nosed Bat (*Scoteanax rueppellii*)

Additional significant migratory species that could sometimes occur include:

- White-bellied Sea-Eagle (*Haliaeetus leucogaster*)
- White-throated Needletail (*Hirundapus caudacutus*)

The woodland community may provide good complex habitat for food and shelter resources for the smaller woodland birds as well as foraging opportunities in the adjacent grassland. The forest also includes some older trees with potential nesting hollows that might suit some of the hollow nesting birds. The hollows may also provide suitable shelter for bats and gliders. The size of this relatively small forest area, may limit the habitat potential of the area particularly in relation to food resources, unless some of these species can forage successfully more widely in the forest and woodland dispersed within the locality.

Dominant fauna identified on the site consisted of the Noisy Miner (*Manorina melanocephala*). The Noisy Miner is listed as a Key Threatening Process under the *Threatened Species Conservation Act*, and the presence of this species may account for a scarcity of other birds within the woodland on the site. It is known to competitively exclude other bird species and is abundant onsite.

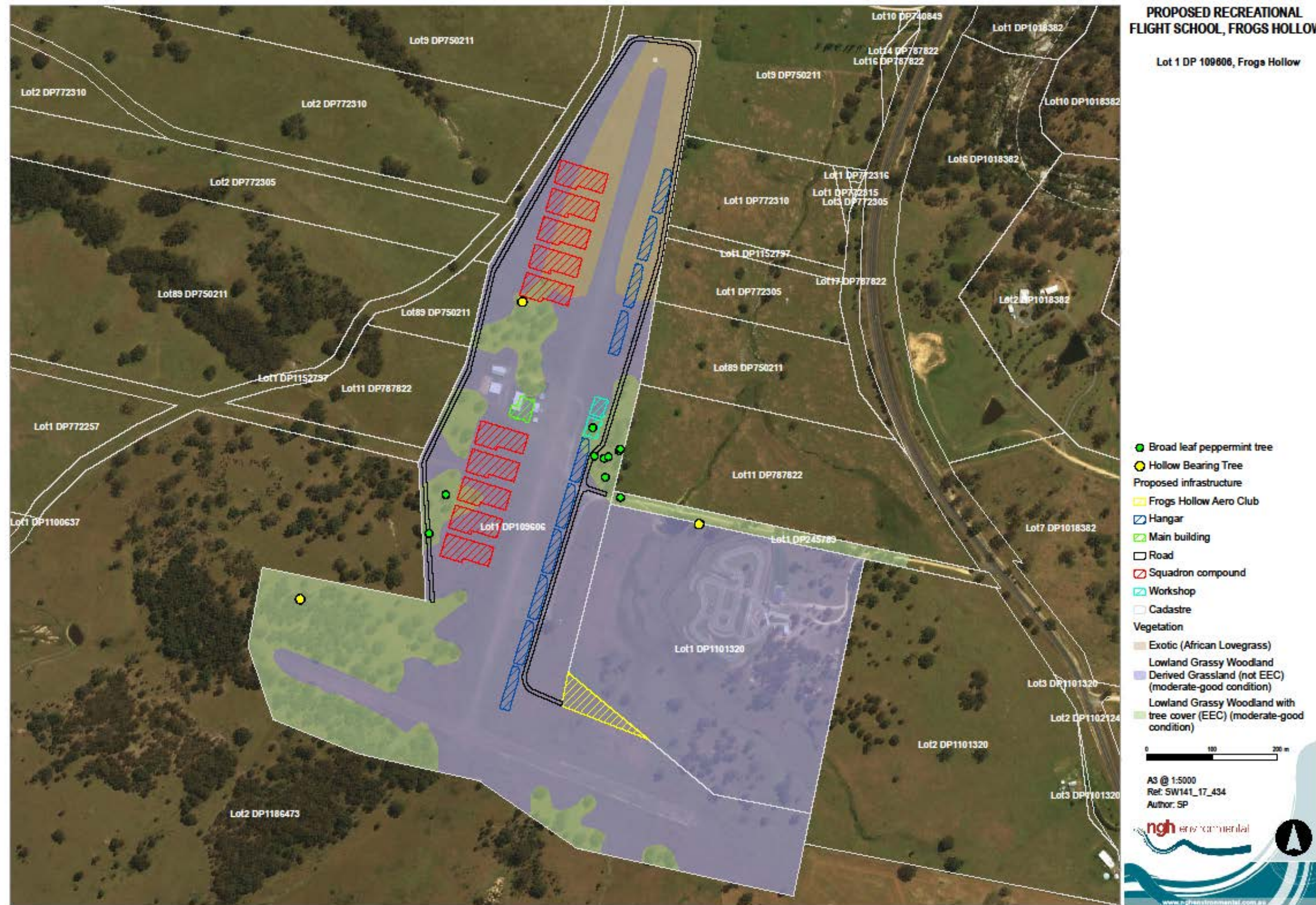


Figure 4-1 Vegetation communities occurring at the proposal site

5 ASSESSMENT OF IMPACTS

5.1 IMPACTS OF THE DEVELOPMENT

The potential biodiversity impacts of development could include:

Construction:

- Clearing to establish required infrastructure
- Noise and vibration during clearing and construction
- Collision risks with plant and vehicles during construction

Operational:

- Noise and vibration due to increased use of the air strip
- Collision risks with aircraft due to increased use of the air strip

As the site is currently operating as an air strip, the key additional impacts relate to clearing for additional infrastructure. Clearing would impact the following vegetation types:

- Lowland grassy woodland – with tree cover and
- Lowland grassy woodland - without tree cover and
- Exotic dominated vegetated areas.

The clearing required in each of these vegetation communities is defined in Table 5-1, by infrastructure component. Greatest impacts result from the development of an internal access road and the Squadron compound.

Of the 5.67 ha of clearing required, 4.43 ha is deemed native vegetation and 0.87 ha is deemed EEC in moderate to good condition.

Impacts are discussed in the sections below, in terms of their potential to impact threatened communities and threatened flora and fauna.

Table 5-1 Clearing required by infrastructure component

Infrastructure	Vegetation Type	Area(ha)
External Road	Lowland Grassy Woodland with tree cover (EEC) (moderate-good condition)	0.36
	Lowland Grassy Woodland Derived Grassland (not EEC) (moderate-good condition)	0
	Exotic (African Lovegrass)	0
Total		0.36
Frogs Hollow Aero Club	Lowland Grassy Woodland with tree cover (EEC) (moderate-good condition)	0
	Lowland Grassy Woodland Derived Grassland (not EEC) (moderate-good condition)	0.36
	Exotic (African Lovegrass)	0
Total		0.36
Hangar	Lowland Grassy Woodland with tree cover (EEC) (moderate-good condition)	0.03
	Lowland Grassy Woodland Derived Grassland (not EEC) (moderate-good condition)	0.68

Infrastructure	Vegetation Type	Area(ha)
	Exotic (African Lovegrass)	0.28
Total		0.99
Main building	Lowland Grassy Woodland with tree cover (EEC) (moderate-good condition)	0
	Lowland Grassy Woodland Derived Grassland (not EEC) (moderate-good condition)	0.09
	Exotic (African Lovegrass)	0
Total		0.09
Internal Roads	Lowland Grassy Woodland with tree cover (EEC) (moderate-good condition)	0.22
	Lowland Grassy Woodland Derived Grassland (not EEC) (moderate-good condition)	0.80
	Exotic (African Lovegrass)	0.29
Total		1.31
Squadron compound	Lowland Grassy Woodland with tree cover (EEC) (moderate-good condition)	0.21
	Lowland Grassy Woodland Derived Grassland (not EEC) (moderate-good condition)	1.57
	Exotic (African Lovegrass)	0.67
Total		2.45
Workshop	Lowland Grassy Woodland with tree cover (EEC) (moderate-good condition)	0.05
	Lowland Grassy Woodland Derived Grassland (not EEC) (moderate-good condition)	0.07
	Exotic (African Lovegrass)	0
Total		0.12
Overall total		5.67

5.2 THREATENED COMMUNITIES

Lowland Grassy Woodland in the South East Corner Bioregion

The development would remove 0.87 ha of EEC, of the 10.82 ha that occurs within the site boundaries. Most of the impact will be due to the construction of the access and internal roads and the construction of the squadron compounds and workshops.

This vegetation would meet the NSW but not Commonwealth criteria. An assessment of significance pursuant to the NSW Threatened Species Conservation Act was completed (Appendix C) to characterise the significance of this clearing.

The assessment concluded that:

- ... some impact to the EEC **Lowland Grassy Woodland** will occur as a result of the proposed subdivision of this site, but the impact would be relatively minor as the site carries very little intact woodland, and even this is of low species diversity. The secondary grassland, while still dominated by native grasses, is also of low diversity and its loss would not be significant.

It is noted that, for the road clearing, there is substantial opportunity to further minimise impacts by redirecting of the road around the existing trees. Further, it is noted that the ingress of the African lovegrass is a threat to the EEC and native dominated vegetation. These are opportunities that can be addressed during construction.

Recommendations have been made to minimise impacts on the Lowland grassy woodland EEC during the proposed development to ensure disturbance is kept to a minimum and indirect impacts are avoided. No other EEC's that could be impacted by the proposal.

5.3 THREATENED FLORA SPECIES

No threatened flora species were identified on the site during the site inspection. The threatened species evaluations found that there is a low likelihood of any threatened flora species occurring on the site. A long history of livestock grazing has depleted the species richness of the Lowland grassy woodland (grassland) community, and woodland clearing in the locality has reduced the area of wooded habitat to the point where the Lowland grassy woodland (woodland) community may be too small to support populations of many species.

Given this and the fact that the proposed development should have minimal impact on either vegetation community, an assessment of significance of impacts (in accordance with the significant impact criteria provided under the NSW TSC Act) is not considered necessary for any threatened flora species.

5.4 THREATENED FAUNA SPECIES

Relevant impacts to fauna include:

- Clearing of habitat
- Avoidance and collision risks, due to construction plant and operational aircraft

As discussed in Section 4.3.2, the site provides some potential habitat for threatened fauna species. The habitat evaluation in Appendix A however, deemed most species unlikely to occur. A limited few have potential however, given the minor extent of clearing in woodland, and the dominance of Noisy Miners (*M. melanocephala*) in these areas, clearing impacts are considered to be low. Three hollow bearing trees were mapped for the site and it is considered that all three could be effectively avoided by the works.

Construction impacts would be of limited duration and given the existing noise and disturbance of the current flights and highway, the cumulative impact of the construction phase is expected to be low. There are few threatened reptiles and small mammals that are relevant to the site but measures to prevent animals being captured in trenches would be of benefit to common species as well.

Increased flights at the site will increase the risk of collisions between birds and aircraft. These strikes can be a significant threat to aircraft safety. Ongoing collisions or collisions with flocks can also be significant for bird populations. There have been no previously known issues with bird collision from the current Frogs Hollow aviation club (pers. comm. N. Boyle, Sept 25, 2017). The site is not near any known congregation areas (such as wetlands). Given the dominance of Noisy Miners at the site, which competitively exclude many woodland birds, the potential of the development to affect bird flight paths or generate significant collision events is considered to be low.

As such, the proposed development is not expected to result in impact to any listed threatened fauna species at either the commonwealth or state levels. Given this, an assessment of significance of impacts (in accordance with the significant impact criteria provided under the NSW TSC Act) is not considered necessary for any of these species.

6 RECOMMENDATIONS

While significant impacts are not anticipated, recommendations are provided below to protect the identified values and minimise impacts to the habitat potential for biodiversity during implementation of the proposed development. The aim of these measures is to maximise opportunities during development to:

- avoid impacts to higher value areas where possible (treed areas)
- minimise impacts where avoidance is not possible.

Table 6-1 Safeguard and mitigation measures

Impact	Safeguard and Mitigation measures
Construction	
Vegetation	• The final construction footprint should be modified to avoid identified hollow bearing trees. • Internal and external road should be completed within a minimal impact area and with the least possible removal of existing trees (with a preference for retaining <i>E. dives</i>). • This works area (including access and laydown areas) should be clearly delineated to minimise disturbance of the Lowland grassy woodland beyond what is required to be constructed. • Areas of disturbance would be kept to the minimum required for the safe and effective completion of the works. • Ensure no indirect impacts on areas of mapped Lowland grassy woodland (tree cover) to be retained, during development. The areas outside the impact area should be delineated as a no-go zone during construction.
Tree protection	• Temporary fencing or other delineation around the perimeter of trees to be protected, prior to the commencement of works. This would be undertaken to protect the structural root zone of mature trees in accordance with Australian Standard 4970.
Trip hazards/ trenches	• Any trip hazards pits or trenches that must remain open overnight would either be: ○ Covered overnight to minimise the risk of entrapment of fauna ○ Checked at first light. Any trapped or injured fauna would be removed from the trenches or treated as required.
Weeds	• Existing infestation of African lovegrass in the works areas and adjacent to them would be controlled prior to works. • A weed control protocol is required to prevent the transport of weed seeds across the site during works. Particular attention would be paid to mapped areas of African lovegrass and seeds captured in wheels, tracks, axles, transmissions, sumps and radiator grills. Storage and use of weed infested top soil must also be addressed. • Machinery would be cleaned prior to leaving the site. • Rehabilitation and follow up controls in areas disturbed by the works so that the weeds are not spread within the site.

Traffic	Vehicles would be required to maintain a slow speed onsite, to minimise collision with fauna (or stock where relevant).
Laydown areas	Temporary works areas such as construction materials / laydown areas required to install the roads, hangar, main building, squadron compound and workshop should not be located within the Lowland grassy woodland (tree cover) during installation. Existing areas of disturbance would be used where practical (noting weed control requirements).
Noise	- Noise would be managed to minimise impacts: - Ensure equipment is well maintained - Operate plant in a quiet and efficient manner. - Reduce throttle setting and turn off equipment when not being used.
Operation	
Traffic	Vehicles would be confined where possible to the formed access tracks to avoid additional impacts on native vegetation.
Weeds	Existing infestations will be managed to suppress the spread of noxious species including African lovegrass.

7 CONCLUSION

This report has been prepared to assess the biodiversity values and potential impacts on those values as a result of a proposed development of at Lot 1 DP109606 1070 Princes Highway, Frogs Hollow NSW.

Although conducted in early spring, which is not ideal for the detection of flora and fauna, the site inspection revealed that the site has experienced some degradation as a result of a long history of livestock grazing and some tree clearing.

Approximately 4.43 ha of native vegetation was identified to be impacted in the study area. 0.87 ha of this is Lowland grassy woodland EEC under the TSC Act. No large areas of native vegetation within the property would require clearance under this proposal.

No listed threatened flora species were recorded within the study area and there is considered to be a very low likelihood of any listed threatened flora species to occur within the site.

Fauna habitat values within the site are coincide with the EEC woodland where Noisy Minors are currently dominating and competitively excluding most other bird species. No significant impacts as a result of the proposal are considered likely for threatened fauna, although some species could occur on occasion.

Recommendations are provided in Table 6-1. Key mitigation measures include avoiding impacts to higher value areas where possible (treed areas, all hollow bearing trees) and minimising impacts where avoidance is not possible. Key measures include minimising the works footprint, protecting vegetation to be retained and managing African lovegrass onsite. With the effective implementation of these measures, the impacts of the proposal are considered manageable and not likely to be significant.

8 REFERENCES

Australian Government Department of Environment and Energy (2017) *EPBC Act Protected Matters Search Tool* for MNES listed under the EPBC Act, Accessed 9 September 2017

<http://www.environment.gov.au/epbc/pmst/>

Office of Environment and Heritage (2017) Threatened species profiles, Accessed 9 September 2017

<http://www.environment.nsw.gov.au/threatenedSpeciesApp>

APPENDIX A THREATENED SPECIES HABITAT EVALUATIONS

OEH BIONET WILDLIFE ATLAS AND EPBC PROTECTED MATTERS SEARCH TOOL

The tables in this attachment present the habitat evaluation for threatened species, ecological communities and endangered populations listed in the Atlas of NSW Wildlife Bionet¹ database, and the Commonwealth EPBC *Protected Matters Search Tool*², as follows:

- OEH Bionet Wildlife Atlas: Lists records of threatened species on the schedule of the TSC Act within the South East Coastal Plains and South East Coastal Ranges (Part C) CMA IBRA Subregions.
- EPBC Protected Matters Search tool: Lists items/species on the Schedules of the EPBC Act with the potential to occur within 10 km of the study area.

Fauna species that are associated with marine environments, including marine bird and mammal species were collectively discounted from the assessments below. Beach nesting birds and fauna requiring wetlands (frogs, waterbirds) were also omitted from consideration since the site is well inland and the only freshwater habitat is a large farm dam which is off-site. Fauna species which are only vagrant in the region have been omitted (Purple-crowned Lorikeet, Superb Fruit-dove, Painted Honeyeater, Black Falcon, Hooded Robin, Brown Treecreeper, Speckled Warbler and the Flame Robin which is more typical of higher elevation areas west of the Bega Valley). Remaining fauna are forest and woodland dwellers, and the habitat was assessed for suitability to sustain them.

Consideration of the habitat requirements of some flora species have also been omitted from the tables on the grounds that either records from the subregion are erroneous (*Astrotricha crassifolia*, *Eucalyptus nicholii* which is commonly cultivated and is present only as planted specimens, *Wahlenbergia scopulicola*) or the species is confined to a limited distribution which is located well to the north, west or south of the site or is found in a specific habitat type not represented within the Frogs Hollow area (*Acacia constablei*, *Baloskion longipes*, *Boronia deanei*, *Bossiaea oligosperma*, *Caladenia tessellata*, *Calotis glandulosa*, *Correa lawrenceana* var. *genoensis*, *Dampiera fusca*, *Distichlis distichophylla*, *Diuris ochroma*, *Eucalyptus aggregata*, *E. imlayensis*, *E. kartzoffiana*, *E. parvula*, *Genoplesium vernale*, *G. rhyoliticum*, *Grevillea acanthifolia* subsp. *paludosa*, *Grevillea renwickiana*, *Leionema ralstonii*, *Leptospermum thompsonii*, *Nematolepis rhytidophylla*, *Plinthanthesis rodwayi*, *Pomaderris gilmourii* var. *cana*, *Pseudanthus ovalifolius*, *Pterostylis alpina*, *Pultenaea baeuerlenii*, *P. parrisiae*, *Senecio spathulatus*, *Westringia davidii*, *Wilsonia rotundifolia*, *Zieria adenophora*, *Z. buxijugum*, *Z. formosa*, *Z. parrisiae*, *Z. tuberculata*).

The likelihood of occurrence is based on presence of habitat, proximity of nearest records and mobility of the species (where relevant). The following classifications are used:

¹ The *Atlas of NSW Wildlife* is administered by the NSW Office of Environment and 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).

Presence of habitat:

- Present: Potential or known habitat is present within the study area
- Marginal: Habitat is present, but is less than optimal for the species and unlikely to be utilised
- Absent: No potential or known habitat is present within the study area

Likelihood of occurrence

- None: Species known or predicted within the locality but the habitat at the subject site is totally unsuitable, or the species is conspicuous and was not seen.
- Unlikely: Species known or predicted within the locality but unlikely to occur in the study area
- Possible: Species could occur in the study area
- Present: Species was recorded during the field investigations

Evaluation of the likelihood of threatened flora occurrence

Species	TSCAct/ FM Act	EPBC Act	Description of habitat ³	Presence of habitat	Likelihood of occurrence
Bega Wattle <i>Acacia georgensis</i>	V	V	Only occurs in the far South East of NSW with known sites at Kianinny Bay in Bournda National Park, on Dr George Mountain, Wadbilliga National Park and in Bemboka and Coolangubra Sections (one location on cliffs above the Towamba River) of the South East Forests National Park. Typically occurs on well-drained, skeletal soils at sites with considerable exposed rock such as cliff tops and rocky knolls.	Absent	None
Merimbula Star-hair <i>Astrotricha</i> sp. Wallagaraugh	E		Has a highly restricted and fragmented distribution in far SE NSW, occurring in the upper reaches of the Wallagaraugh River south-west of Eden and between Merimbula and Bournda National Park, primarily in the Tura Beach area, where it grows on infertile soils derived from Tertiary sediments. The northern (Bournda) population occurs on infertile deep grey-white sands derived from Tertiary sediments in rough-barked eucalypt forest (<i>Eucalyptus sieberi</i> and <i>E. globoidea</i> dominant) with <i>Banksia serrata</i> , <i>Acacia longifolia</i> and <i>Grevillea mucronulata</i> .	Absent	None
Chef's Cap Correa <i>Correa baeuerlenii</i>	V	V	Chef's Cap Correa has been recorded between Nelligen (on Nelligen Creek and the Buckenbowra River) and Mimosa Rocks National Park. It occurs in riparian sites and on rocky rises within forests of various eucalypts, including Silvertop Ash (<i>Eucalyptus sieberi</i>), Yellow Stringybark (<i>E.</i>	Absent	None

³ Information sourced from species profiles on NSW OEH's threatened species database or the Australian Government's Species Profiles and Threats database (SPRAT) unless otherwise stated.

OEH threatened species database: <http://www.environment.nsw.gov.au/threatenedspeciesapp/>

SPRAT: <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>

Species	TSCAct/ FM Act	EPBC Act	Description of habitat ³	Presence of habitat	Likelihood of occurrence
			<i>muelleriana</i>), Blue-leafed Stringybark (<i>E. agglomerata</i>) and Spotted Gum (<i>Corymbia maculata</i>).		
Leafless Tongue Orchid <i>Cryptostylis hunteriana</i>	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). However in Bega Valley LGA there is only a single, quite old record from Ben Boyd National Park. The species is known from a range of communities, including swamp-heath and woodland, most often on infertile, sandy soils. The larger populations typically occur in woodland dominated by Scribbly Gum (<i>Eucalyptus sclerophylla</i>), Silvertop Ash (<i>E. sieberi</i>), Red Bloodwood (<i>Corymbia gummifera</i>) and Black Sheoak (<i>Allocasuarina littoralis</i>); appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (<i>C. subulata</i>) and the Tartan Tongue Orchid (<i>C. erecta</i>).	Absent	None
Tangled Bedstraw <i>Galium australe</i>	E		Tangled Bedstraw is widespread in Victoria and is also found in South Australia and Tasmania. There are a number of records from southern NSW but many of these are erroneous, based on confusion with a similar and common species, <i>Galium leiocarpum</i> (K. McDougall, OEH, pers. comm.). In Bega Valley LGA there is a single correct record from Nadgee Lake Beach in Nadgee Nature Reserve, growing in coastal dunes (J. Miles, pers. obs.) and a record from the Towamba Valley, which has not been verified. Due to the dubious nature of many records its habitat preferences are unknown, but in Victoria it is usually found in a range of near-coastal habitats, including sand dunes, sand spits, shrubland and woodland.	Absent	None
Square Raspwort <i>Haloragis exalata</i> subsp. <i>exalata</i> var. <i>exalata</i>	V	V	The current distribution of Square Raspwort is in the central coast and south coast botanical subdivisions of NSW, with some very old records from the Sydney Basin and Hunter Valley. On the far south coast it grows in wet soils on the margins of coastal lakes and along creeks running into them between	Absent	None

Species	TSCAct/ FM Act	EPBC Act	Description of habitat ³	Presence of habitat	Likelihood of occurrence
			Durras Lake north of Batemans Bay and Cuttagee Lake south of Bermagui. Despite searches of suitable habitat (Miles and Cameron, 2007) it has not been found growing south of Cuttagee Lake.		
Yellow Loosestrife <i>Lysimachia vulgaris</i> var. <i>davurica</i>	E		This species also grows in the Northern Hemisphere, and has been recorded from a few widely separated locations in wetlands in eastern Australia, to which it may have been introduced by migratory waterbirds. Locally it has been recorded from a single swamp at Jellat Jellat on the Bega River floodplain, in a deep permanent wetland (J. Miles, pers. obs.).	Absent	None
Hoary Sunray <i>Leucochrysum albicans</i> var. <i>tricolor</i>		E	Grows in grassland and grassy woodland on the tablelands, often associated with rock outcrops or other areas with skeletal soils. It can become locally common on road verges where there are suitable shallow gravelly soils. The nearest records are south of Nimmitabel. The only occurrence of <i>Leucochrysum albicans</i> in the Bega Valley is of the unlisted var. <i>albicans</i> , a yellow flowered form of the species.	Absent	None
Large-leafed Monotaxis <i>Monotaxis macrophylla</i>	E		Large-leaf Monotaxis is recorded from several highly disjunct populations in NSW: eastern edge of Deua NP (west of Moruya), Bemboka portion of South East Forests National Park, Cobar area, the Tenterfield area, and Woodenbong (near the Queensland border). It is also in Queensland. <i>Monotaxis macrophylla</i> displays the properties of a fire ephemeral species. Germination is stimulated by the passage of fire, individual plants have a short life span, a large biomass is produced in a short period of time, flowering occurs shortly after germination, and populations do not persist in the absence of fire. Grows on rocky ridges and hillsides. There is a great diversity in the associated vegetation within NSW encompassing coastal heath, arid shrubland, forests and montane heath from almost sea level to 1300m altitude.	Absent	None
Tall Knotweed <i>Persicaria elatior</i>	V	V	Tall Knotweed has been recorded in south-eastern NSW from a few sites between Batemans Bay and Cuttagee Creek (J. Miles, pers. obs.).	Absent	None

Species	TSCAct/ FM Act	EPBC Act	Description of habitat ³	Presence of habitat	Likelihood of occurrence
			This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance such as flooding or the drying of water bodies during drought.		
Bodalla Pomaderris <i>Pomaderris bodalla</i>	V		Bodalla Pomaderris is endemic to NSW and is currently known to occur on the south coast between Bodalla and Pambula, and in the upper Hunter Valley near Muswellbrook. The majority of populations are small. All populations have locally restricted distributions. Bodalla Pomaderris is in the conservation reserves of Kooraban National Park on the south coast, and in Wollemi National Park and Wingen Maid Nature Reserve in the north of its range. Other populations on the south coast are located in State Forests and on private land. On the south coast <i>Pomaderris bodalla</i> occurs in moist open forest along sheltered gullies or along stream banks.	Absent	None
Cotoneaster Pomaderris <i>Pomaderris cotoneaster</i>		E	Cotoneaster Pomaderris has a very disjunct distribution, being known from the Nungatta area, northern Kosciuszko National Park (near Tumut), the Tantawangalo area in South-East Forests National Park and adjoining freehold land, Badgery's Lookout near Tallong, the Yerranderie area, the Canyonleigh area and Ettrema Gorge in Morton National Park. The species has also been recorded along the Genoa River in Victoria. Cotoneaster Pomaderris has been recorded in a range of habitats in predominantly forested country. It usually occurs in rocky areas or near/in creek beds. Populations tend to be isolated and range in size from a few individuals to many hundreds.	Absent	None
Lacy Pomaderris <i>Pomaderris elachophylla</i>	E		Apparently restricted to escarpment forests in the far south of the State, and also in Victoria and Tasmania. The species has been recorded near Brown Mountain in Glenbog State Forest, and in the Coolangubra, Nalbaugh and Tantawangalo sections of South East Forests National Park. Small populations also occur on private land and adjacent roadside reserve near Tantawangalo Mountain.	Absent	None

Species	TSCAct/ FM Act	EPBC Act	Description of habitat ³	Presence of habitat	Likelihood of occurrence
			Found in and adjacent to creeklines and gullies, or at sites with impeded drainage, often on sheltered aspects, in tall damp forest at high elevations.		
Parris' Pomaderris <i>Pomaderris parrisiae</i>	V	V	Parris' Pomaderris has been recorded in Egan Peaks Nature Reserve, Wadbilliga National Park (near Wadbilliga Trig.) and South East Forests National Park (Brown Mountain / Cochrane Dam area), with a questionable record in Ben Boyd National Park. Parris' Pomaderris is found on shallow soils in rocky shrubland or tall open forest chiefly on escarpment ranges.	Absent	None
Matted Bush-pea <i>Pultenaea pedunculata</i>	E		Matted Bush-pea is widespread in Victoria, Tasmania, and south-eastern South Australia. In NSW however, it is represented by just three disjunct populations, in the Cumberland Plains in Sydney, the coast between Wallagoot Lake and Bermagui and the Windellama area south of Goulburn (where it is locally abundant). The Matted Bush-pea occurs in a range of habitats. NSW populations are generally among woodland vegetation but plants have also been found on road batters and coastal cliffs. It is largely confined to loamy soils in dry gullies in populations in the Windellama area.	Absent	None
Austral Toadflax <i>Thesium australe</i>	V	V	Austral Toadflax 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. Occurs in grassland or grassy woodland, often found in damp sites in association with Kangaroo Grass (<i>Themeda triandra</i>). It is a root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass.	Absent	None
Hidden Violet <i>Viola cleistogamoides</i>	E		Hidden Violet is locally common in parts of coastal Victoria, Tasmania and South Australia. In NSW it is known from a collection at Wonboyn in 1954 and recent sightings in heath from Nadgee Nature Reserve to near Tathra (J. Miles, pers. obs.) and dry eucalypt forest in the Eden hinterland.	Absent	None

Species	TSCAct/ FM Act	EPBC Act	Description of habitat ³	Presence of habitat	Likelihood of occurrence
			In forest typical habitat appears to be disturbed sites such as tracks, firebreaks and slashed road verge where large plants have been suppressed, enabling this very small plant to colonise and persist.		
Narrow-leafed Wilsonia <i>Wilsonia backhousei</i>	V		In NSW Narrow-leaf Wilsonia is found on the coast between Mimosa Rocks National Park and Wamberal north of Sydney. It grows in all southern states. This is a species of the margins of salt marshes and lakes or other saline situations such as beaches and sea cliffs (J. Miles, pers. obs.).	Absent	None
Swamp Everlasting <i>Xerochrysum palustre</i>	P	V	This perennial daisy grows in and around the edges of montane peatlands and bogs on the escarpment on the NSW Southern and Central Tablelands, and is also present in Victoria.	Absent	None
EECs					
Araluen Scarp Grassy Forest in the South East Corner Bioregion	EEC		Confined to Eurobodalla LGA in the Araluen Valley area.	Absent	None
Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions	EEC		Bangalay Sand Forest is typically dominated by tree species <i>Eucalyptus botryoides</i> (Bangalay) and <i>Banksia integrifolia</i> subsp. <i>integrifolia</i> (Coast Banksia), while <i>Eucalyptus pilularis</i> (Blackbutt) and <i>Acmena smithii</i> (Lilly Pilly) may occur in more sheltered situations, and <i>Casuarina glauca</i> (Swamp Oak) may occur on dunes exposed to salt-bearing sea breezes or where Bangalay Sand Forest adjoins Swamp Oak Floodplain Forest. It grows only on sand in close proximity to the sea.	Absent	None
Brogo Wet Vine Forest in the South East Corner Bioregion	EEC		This community is found in Bega Valley and Eurobodalla LGAs, usually growing on granite-derived soils and exposed aspects in moderately hilly terrain. Typical dominants are <i>Eucalyptus tereticornis</i> (Forest Red Gum), <i>Acacia implexa</i> (Hickory Wattle), <i>Brachychiton populneus</i> (Kurrajong) and <i>Ficus rubiginosa</i> (Port Jackson Fig). Despite the reference to wet forest in the name of this community, it is more of a grassy woodland which has not been subject to frequent fire and has therefore come to include a lot of mesic species such as vines (J. Miles, pers. obs.).	Absent	None

Species	TSCAct/ FM Act	EPBC Act	Description of habitat ³	Presence of habitat	Likelihood of occurrence
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	EEC	Occurs in estuaries and on the margins of coastal lakes, in gently sloping areas where tidal flushing occurs.	Absent	None
Dry Rainforest of the South East Forests in the South East Corner Bioregion	EEC		This community occurs as small pockets of non-sclerophyll forest dominated by shorter rainforest trees with occasional emergent eucalypts. It is usually embedded within Brogo Wet Vine Forest, sharing its preference for warmer north-facing upper slopes. <i>Ficus rubiginosa</i> (Port Jackson Fig) is the most common dominant, but other rainforest trees such as <i>Pittosporum undulatum</i> (Sweet Pittosporum), <i>Brachychiton populneus</i> (Kurrajong) and <i>Alectryon subcinereus</i> (Native Quince) may also occur as well as sclerophyll elements such as <i>Acacia implexa</i> . There is usually little shrub layer or groundcover due to the dense shade cast by the fig canopy.	Absent	None
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC		Occurs in freshwater situations on floodplains of major and minor rivers and consists of herbaceous freshwater aquatic and semi-aquatic plants such as reeds, sedges and floating or submerged forbs. Woody plants are usually scarce or absent.	Absent	None
Lowland Grassy Woodland in the South East Corner Bioregion	EEC	CEEC	A grassy woodland dominated by Forest Red Gum <i>Eucalyptus tereticornis</i> and Rough-barked Apple <i>Angophora floribunda</i> , with Black Wattle <i>Acacia mearnsii</i> , <i>A. implexa</i> and <i>Bursaria spinosa</i> and a dense and diverse grassy understorey, growing usually on granodiorite in coastal rainshadow valleys of the Eurobodalla and Bega Valley LGAs.	Present	Present
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia		CEEC	Occurs within a few kilometres of the sea, on sand dunes, coastal headlands and on the shores of coastal lakes or estuaries.	Absent	None
Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	EEC	EEC	Found in drainage depressions at high altitude along the crest of the coastal escarpment, usually in the headwaters of drainage lines, and in the Snowy Mountains. <i>Sphagnum cristatum</i> (Sphagnum Moss) may or may not be present, along with a high diversity of grasses, sedges and forbs, growing in wet to waterlogged peaty soils.	Absent	None

Species	TSCAct/ FM Act	EPBC Act	Description of habitat ³	Presence of habitat	Likelihood of occurrence
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC		Occurs on the edges of major and minor river floodplains. Typical dominant trees on the south coast are Forest Red Gum (<i>E. tereticornis</i>), Rough-barked Apple (<i>Angophora floribunda</i>) and River Peppermint (<i>E. elata</i>).	Absent	None
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC		Occurs in freshwater and saline situations around estuaries and coastal lakes and on floodplains of major and minor rivers, dominated by Swamp Oak (<i>Casuarina glauca</i>).	Absent	None
Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	EEC		The structure of the community is typically closed tussock grassland, but may be open shrubland or open heath with a grassy matrix between the shrubs. <i>Themeda australis</i> is the dominant species in this ecological community. <i>Themeda australis</i> is an extremely widespread species, but in this community it may have a distinctive appearance, being prostrate and having glaucous leaves.	Absent	None
Key E TSC = listed as Endangered under Schedule 1 of the NSW <i>Biodiversity Conservation Act 2016</i> (E1 – Endangered, E4 – Extinct, E4A – Critically Endangered) E EPBC = listed as Endangered under the Commonwealth <i>Environment Protection & Biodiversity Conservation Act 1999</i>. V TSC = listed as Vulnerable under Schedule 2 of the NSW <i>Biodiversity Conservation Act 2016</i>. V EPBC = listed as Vulnerable under the Commonwealth <i>Environment Protection & Biodiversity Conservation Act 1999</i>. EEC TSC = listed as an Endangered Ecological Community under the NSW <i>Biodiversity Conservation Act 2016</i>. EEC EPBC = Listed as an Endangered Ecological Community under the <i>Environment Protection and Biodiversity Conservation Act 1999</i>. CEEC EPBC = Listed as a Critically Endangered Ecological Community under the <i>Environment Protection and Biodiversity Conservation Act 1999</i>.					

Evaluation of the likelihood of threatened fauna occurrence

Species	TSC Act/ FM Act	EPBC Act	Description of habitat ⁴	Presence of habitat	Likelihood of occurrence
Aves					
<i>Anthochaera Phrygia</i> Regent Honeyeater	CE	CE	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. 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 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.	Marginal	Unlikely
<i>Burhinus grallarius</i> Bush Stone-curlew	E		Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Largely nocturnal, being especially active on moonlit nights. Feed on insects and small vertebrates, such as frogs, lizards and snakes.	Marginal	None
<i>Circus assimilis</i> 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.	Present	Unlikely

⁴ Information sourced from species profiles on NSW OEH's threatened species database or the Australian Government's Species Profiles and Threats database (SPRAT) unless otherwise stated.

OEH threatened species database: <http://www.threatenedspecies.environment.nsw.gov.au/index.aspx>

SPRAT: <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>

Species	TSC Act/ FM Act	EPBC Act	Description of habitat ⁴	Presence of habitat	Likelihood of occurrence
			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 (eg bandicoots, bettongs, and rodents), birds and reptiles, occasionally insects and rarely carrion.		
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle		M	White-bellied Sea-Eagles are a common sight in coastal and near coastal areas of Australia. They occasionally forage further inland, following rivers up from the coast. Birds form permanent pairs that inhabit territories throughout the year. 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. 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, usually close to water.	Marginal	Unlikely
<i>Pandion cristatus</i> Eastern Osprey	V		The Osprey is a regular visitor to the far south coast and is usually recorded in the warmer months, but has been detected throughout the year. It has been recorded regularly on Merimbula Lake in recent years. It feeds mainly on fish snatched from the water surface. A large stick nest is built in a live or dead tree or on man-made structures, usually close to water.	Absent	None
<i>Hieraaetus morphnoides</i> Little Eagle	V		The Little Eagle is a medium-sized bird of prey that is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. Occupies open eucalypt forest, woodland or open woodland. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Lays two or three eggs during spring, and young fledge in early summer. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion.	Present	Possible
<i>Calamanthus fuliginosus</i> Striated Fieldwren	E		Mainly a bird of ground and understorey vegetation, and can be found in swampy, coastal heathlands, tussocky grasslands, low shrubby vegetation and margins of swamps.	Absent	None
<i>Lophoictinia isura</i>	V		The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia, Queensland, NSW and Victoria. In NSW,	Marginal	Unlikely

Species	TSC Act/ FM Act	EPBC Act	Description of habitat ⁴	Presence of habitat	Likelihood of occurrence
Square-tailed Kite			scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs.		
<i>Callocephalon fimbriatum</i> Gang-gang Cockatoo	V		The Gang-gang Cockatoo is distributed from southern Victoria through south- and central-eastern New South Wales. In summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. Move to lower altitudes in winter, preferring more open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas. Favours old growth attributes for nesting and roosting. Feeds on a variety of seeds including eucalypt and wattle.	Marginal	Unlikely
<i>Calyptorhynchus lathami</i> Glossy Black-Cockatoo	V		Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Feeds almost exclusively on the seeds of several species of she-oak (typically Black Sheoak <i>Allocasuarina littoralis</i> on the south coast), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites.	Absent	None
<i>Glossopsitta pusilla</i> 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. Feeds mostly on nectar	Marginal	Unlikely

Species	TSC Act/ FM Act	EPBC Act	Description of habitat ⁴	Presence of habitat	Likelihood of occurrence
			and pollen, occasionally on native fruits such as mistletoe. 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.		
<i>Lathamus discolor</i> 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. 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 <i>Eucalyptus robusta</i> , Spotted Gum <i>Corymbia maculata</i> , Red Bloodwood <i>C. gummifera</i> , Mugga Ironbark <i>E. sideroxylon</i> , and White Box <i>E. albens</i> .	Absent	Unlikely
<i>Neophema pulchella</i> Turquoise Parrot	V		Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Usually seen in pairs or small groups of up to thirty individuals. Spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter.	Present	Unlikely
<i>Tyto novaehollandiae</i> 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. 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.	Present	Unlikely
<i>Tyto tenebricosa</i> Sooty Owl	V		Occupies the coast, coastal escarpment and eastern tablelands in NSW. Territories are occupied permanently. Occurs in rainforest, including dry	Absent	None

Species	TSC Act/ FM Act	EPBC Act	Description of habitat ⁴	Presence of habitat	Likelihood of occurrence
			rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. Roosts by day in the hollow of a tall forest tree or in heavy vegetation; hunts by night for small ground mammals or tree-dwelling mammals such as the Common Ringtail Possum (<i>Pseudocheirus peregrinus</i>) or Sugar Glider (<i>Petaurus breviceps</i>). Nests in very large tree-hollows.		
<i>Ninox strenua</i> Powerful Owl	V		The Powerful Owl occurs mainly on the coastal side of the Great Dividing Range from Mackay to south-western Victoria. It lives in forests and woodlands. 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. 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. 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. The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider.	Absent	None
<i>Ninox connivens</i> Barking Owl	V		Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. Is flexible in its habitat use and hunting can extend in to closed forest and more open areas. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as <i>Acacia</i> and <i>Casuarina</i> species. During nesting season, the male perches in a nearby tree overlooking the hollow entrance.	Marginal	Unlikely
<i>Dasyornis brachypterus</i>	E	E	The distribution of the Eastern Bristlebird has contracted to three disjunct areas of south-eastern Australia: southern Queensland/northern NSW, the	Absent	None

Species	TSC Act/ FM Act	EPBC Act	Description of habitat ⁴	Presence of habitat	Likelihood of occurrence
Eastern Bristlebird			Illawarra Region and in the vicinity of the NSW/Victorian border. The southern population in Nadgee Nature Reserve and East Gippsland is around 200 birds. Habitat is dense, low vegetation including heath and open woodland with a heathy understorey; Illawarra and southern populations reach maximum densities in habitat that has not been burnt for at least 15 years.		
<i>Pachycephala olivacea</i> Olive Whistler	V		The Olive Whistler inhabits the wet forests on the ranges of the east coast. It has a disjunct distribution in NSW from the MacPherson Ranges in the north and wet forests from Illawarra south to Victoria. In the south it is found inland to the Snowy Mountains and the Brindabella Range. Mostly inhabit wet forests above about 500m. During the winter months they may move to lower altitudes. Forage in trees and shrubs and on the ground, feeding on berries and insects. Make nests of twigs and grass in low forks of shrubs.	Absent	None
<i>Daphoenositta chrysoptera</i> 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 <i>Acacia</i> woodland. The Varied Sittella feeds on arthropods gleaned from crevices in rough or decortivating 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.	Present	Possible
<i>Artamus cyanopterus cyanopterus</i> 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).	Present	Possible
<i>Petroica boodang</i> Scarlet Robin	V		The Scarlet Robin is found from SE Queensland to SE South Australia and also in Tasmania and SW Western Australia. In NSW, it occurs from the coast to the	Present	Possible

Species	TSC Act/ FM Act	EPBC Act	Description of habitat ⁴	Presence of habitat	Likelihood of occurrence
			inland slopes, where it migrates seasonally between coastal and inland areas. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees. 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. 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.		
<i>Petroica rodinogaster</i> Pink Robin	V		Inhabits rainforest and tall, open eucalypt forest, particularly in densely vegetated gullies. The nest is a deep, spherical cup made of green moss bound with cobweb and adorned with camouflaging lichen, and is lined with fur and plant down. It is situated in an upright or oblique fork, from 30cm to 6m above the ground, in deep undergrowth. Catches prey by the perch-and-pounce method, foraging more on the ground than the more flycatcher-like Rose Robin. Insects and spiders are the main dietary items.	Absent	None
<i>Stagonopleura guttata</i> Diamond Firetail	V		The Diamond Firetail range extends from central Queensland to the Eyre Peninsula in South Australia. It is widely distributed in NSW, with a concentration of records from Tablelands, Slopes and the North West Plains and Riverina. Not commonly found in coastal districts, though there are records from near Sydney, the Hunter Valley and the Bega Valley. Feeds on seeds, mostly grasses, and nests in shrubs, low tree branches and mistletoe clumps. Usually encountered in flocks of between five to 40 birds, occasionally more. Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum <i>Eucalyptus pauciflora</i> Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities.	Present	Unlikely
<i>Hirundapus caudacutus</i>		M	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;	Present	Possible

Species	TSC Act/ FM Act	EPBC Act	Description of habitat ⁴	Presence of habitat	Likelihood of occurrence
White-throated Needletail			Quested 1982; Tarburton 1993), though the number of references to Needletails roosting in trees possibly over-emphasizes such occurrences (Higgins 1999). It has been suggested that they also sometimes roost aerially (Currie 1928; Dove 1919; Schulz & Kristensen 1994), and it was formerly erroneously thought that the species did not alight while in Australia (Pescott 1983), but they do spend most of their time on the wing, hunting aerial insects. Does not breed in Australia, being a summer migrant only, and breeding in Asia.		
<i>Monarcha melanopsis</i> Black-faced Monarch		M	The Black-faced Monarch mainly occurs in rainforest ecosystems, and in nearby open eucalypt forests (mainly wet sclerophyll forests), especially in gullies with a dense, shrubby understorey as well as in dry sclerophyll forests and woodlands, often with a patchy understorey.	Absent	None
<i>Myiagra cyanoleuca</i> Satin Flycatcher		M	Satin Flycatchers mainly inhabit eucalypt forests, often near wetlands or watercourses. They generally occur in moister, taller forests than the Leaden Flycatcher, <i>Myiagra rebecula</i> , often occurring in gullies. In south-eastern Australia, they occur at elevations of up to 1400 m above sea level.	Absent	None
<i>Rhipidura rufifrons</i> Rufous Fantail		M	This species is found in a variety of habitats including eucalypt woodlands and watercourses where it nests in a horizontal fork of a tree up to 12m from the ground. Breeds in southern Australia, but is known to migrate to inland Australia, PNG, Solomon Islands, New Caledonia and Indonesia.	Absent	None
Mammals					
<i>Dasyurus maculatus</i> Spotted-tailed Quoll	V	E	Found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Queensland. Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites. They need suitable den sites and abundant food, requiring large areas of intact vegetation for foraging. Use 'latrine sites', often on flat rocks among boulder fields and rocky cliff-faces; latrine sites can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals. Consumes a variety of prey, including gliders, possums, small wallabies, rats,	Absent	None

Species	TSC Act/ FM Act	EPBC Act	Description of habitat ⁴	Presence of habitat	Likelihood of occurrence
			birds, bandicoots, rabbits and insects; also eats carrion and takes domestic fowl.		
<i>Isoodon obesulus obesulus</i> Southern Brown Bandicoot (eastern)		E	Southern Brown Bandicoots are largely crepuscular (active mainly after dusk and/or before dawn). They are generally only found in heath or open forest with a heathy understorey on sandy or friable soils. They feed on a variety of ground-dwelling invertebrates and the fruit-bodies of hypogeous (underground-fruiting) fungi. Their searches for food often create distinctive conical holes in the soil. Nest during the day in a shallow depression in the ground covered by leaf litter, grass or other plant material.	Absent	None
<i>Phascolarctos cinereus</i> Koala	V	V	Occurs in eastern Australia, from north-eastern Queensland to south-eastern South Australia and to the west of the Great Dividing Range. In NSW it mainly occurs on the central and north coasts with some populations in the western region. It was historically abundant on the south coast of NSW, but now occurs in sparse and possibly disjunct populations. The koala inhabits a range of eucalypt forest and woodland communities, including coastal 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. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. Breeding season for the koala peaks between September and February.	Marginal	Unlikely
<i>Phascogale tapoatafa</i> Brush-tailed Phascogale	V		The Brush-tailed Phascogale has a patchy distribution around the coast of Australia. In NSW it is mainly found east of the Great Dividing Range although there are occasional records west to the divide. Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. 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 - 60 ha, while males have overlapping territories of up to 100 ha.	Marginal	Unlikely

Species	TSC Act/ FM Act	EPBC Act	Description of habitat ⁴	Presence of habitat	Likelihood of occurrence
			Nest and shelter in tree hollows with entrances 2.5 - 4 cm wide and use many different hollows over a short time span.		
<i>Sminthopsis leucopus</i> White-footed Dunnart	V		The White-footed Dunnart occupies the coastal strip in southern NSW and Victoria, and parts of Tasmania, living in a range of near-coastal habitats from forest to dune scrub. It is difficult to detect and likely to be under-recorded. It is a tiny predator of terrestrial arthropods (insects and spiders) and nests under loose bark or logs.	Absent	None
<i>Potorus tridactylus tridactylus</i> Long-nosed Potoroo	V	V	The Long-nosed Potoroo (SE Mainland) is sparsely distributed along the coast and Great Dividing Range of south-east Queensland through NSW where it can be found in wet eucalypt forests to coastal heaths and scrubs. The main habitat factors would appear to be access to some form of dense vegetation for shelter and the presence of an abundant supply of fungi for food.	Absent	None
<i>Pseudomys fumeus</i> Smoky Mouse	CE	E	The Smoky Mouse is currently limited to a small number of sites in western, southern and eastern Victoria, south-east NSW and the ACT. The species appears to prefer heath habitat on ridge tops and slopes in sclerophyll forest, heathland and open-forest from the coast (in Victoria) to sub-alpine regions of up to 1800 metres, but sometimes occurs in ferny gullies.	Absent	None
<i>Cercartetus nanus</i> Eastern Pygmy-possum	V		Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; soft fruits are eaten when flowers are unavailable. Also feeds on insects throughout the year. Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum dreys or thickets of vegetation; tree hollows are favoured but spherical nests have been found under the bark of eucalypts and in shredded bark in tree forks. Appear to be mainly solitary, each individual using several nests, with males having non-exclusive home-ranges of about 0.68 hectares and females about 0.35 hectares. Agile climbers, but can be caught on the ground in traps, pitfalls or postholes; generally nocturnal.	Absent	None

Species	TSC Act/ FM Act	EPBC Act	Description of habitat ⁴	Presence of habitat	Likelihood of occurrence
<i>Petauroides volans</i> Greater Glider		V	Found along the east coast of Australia in Eucalypt-dominated forests on coast to tall forests in the ranges and low woodland W of Great Dividing Range; not in rainforests. Feeds on eucalypt foliage, shelters in large tree hollows.	Absent	None
<i>Petaurus australis</i> Yellow-bellied Glider	V		The Yellow-bellied Glider is found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria. Extract sap by incising (or biting into) the trunks and branches of favoured food trees, often leaving a distinctive 'V'-shaped scar, or large patches with bark removed. Occur in mature eucalypt forest generally in areas with high rainfall and a variety of eucalypt species to provide for continuity of food resources (nectar and other plant exudates, insects). Live in small family groups of two - six individuals and are nocturnal, and usually very detectable due to frequent vocalisation when moving through the forest to feed. Den, often in family groups, in hollows of large trees. Very mobile and occupy large home ranges between 20 to 85 ha to encompass dispersed and seasonally variable food resources.	Absent	None
<i>Pteropus poliocephalus</i> Grey-headed Flying-fox	V	V	Grey-headed Flying-foxes are found within 200 km of the eastern coast of Australia, from Bundaberg in Queensland to Melbourne in Victoria. 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, often in stands of riparian rainforest, Paperbark or Casuarina forest, and are commonly found in gullies, close to water, or in vegetation with a dense canopy. Forage on the nectar and pollen of native trees, in particular <i>Eucalyptus</i> , <i>Melaleuca</i> and <i>Banksia</i> , and fruits of rainforest trees and vines. Travel up to 50 km to forage. Annual mating commences in January and a single young is born each October or November. Site fidelity to camps is high with some camps being used for over a century.	Present	Possible
<i>Falsistrellus tasmaniensis</i>	V		The Eastern False Pipistrelle is found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania.	Marginal	Unlikely

Species	TSC Act/ FM Act	EPBC Act	Description of habitat ⁴	Presence of habitat	Likelihood of occurrence
Eastern False Pipistrelle			Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, or under loose bark on trees or in buildings. Hunts beetles, moths, weevils and other flying insects above or just below the tree canopy.		
<i>Mormopterus norfolkensis</i> Eastern Freetail-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.	Present	Possible
<i>Kerivoula papuensis</i> Golden-tipped Bat	V		Found in rainforest and adjacent wet and dry sclerophyll forest up to 1000m. Also recorded in tall open forest, <i>Casuarina</i> -dominated riparian forest and coastal <i>Melaleuca</i> forests. Roost mainly in rainforest gullies on small first- and second-order streams in usually abandoned hanging Yellow-throated Scrubwren and Brown Gerygone nests modified with an access hole on the underside. Bats may also roost under thick moss on tree trunks, in tree hollows, dense foliage and epiphytes.	Absent	None
Eastern Bentwing-bat	V		Eastern 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.	Marginal	Unlikely
<i>Myotis macropus</i> 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 over streams and pools catching insects and small fish by raking their feet across	Absent	None

Species	TSC Act/ FM Act	EPBC Act	Description of habitat ⁴	Presence of habitat	Likelihood of occurrence
			the water surface. In NSW females have one young each year usually in November or December.		
<i>Scoteanax rueppellii</i> 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. 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 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.	Present	Possible
<i>Saccolaimus flaviventris</i> Yellow-bellied Sheath-tail-bat	V		The Yellow-bellied Sheath-tail-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.	Present	Possible
Key V: Vulnerable E: Endangered E*: Endangered population					

Species	TSC Act/ FM Act	EPBC Act	Description of habitat ⁴	Presence of habitat	Likelihood of occurrence
CE: Critically Endangered M: Migratory Terrestrial					

APPENDIX B FLORA SPECIES LISTS

Scientific name	Common name	Family	Abundance	
			W'ld	Grass
TREES				
<i>Acacia mearnsii</i>	Black Wattle	Fabaceae	1	
<i>Angophora floribunda</i>	Rough-barked Apple	Myrtaceae	1-3	
<i>Eucalyptus dives</i>	Broad-leafed Peppermint	Myrtaceae	1-2	
<i>Eucalyptus tereticornis</i>	Forest Red Gum	Myrtaceae	1-3	
SHRUBS, SUB-SHRUBS				
<i>*Rubus ulmifolius</i>	Blackberry	Rosaceae	1	
FERNS				
<i>Pteridium esculentum</i>	Bracken	Dennstaedtiaceae	2-3	0-3
VINES AND TWINERS				
<i>Glycine clandestina</i>	Twining Glycine	Fabaceae	1	
FORBS				
<i>*Acetosella vulgaris</i>	Sheep Sorrel	Polygonaceae	1	1
<i>*Centaureium sp.</i>	Centaury	Gentianaceae		1
<i>*Cerastium sp.</i>	Mouse-ear Chickweed	Caryophyllaceae	2	1
<i>*Cirsium vulgare</i>	Black or Spear Thistle	Asteraceae	1	
<i>*Conyza sumatrensis</i>	Tall Fleabane	Asteraceae	1	1
<i>Dichondra repens</i>	Kidney Weed	Convolvulaceae	1	
<i>Euchiton japonicus</i>	Slender Cudweed	Asteraceae	1	
<i>*Facelis retusa</i>		Asteraceae	1	2
<i>*Gamochaeta americana</i>	Cudweed	Asteraceae	2	1
<i>*Gamochaeta calviceps</i>	Silver Cudweed	Asteraceae		2
<i>*Hypochaeris radicata</i>	Cat's Ear, Flatweed	Asteraceae	3	3
<i>*Petrorhagia nanteuillii</i>	Proliferous Pink	Caryophyllaceae	1	
<i>*Plantago lanceolata</i>	Ribbed Plantain	Plantaginaceae	2	1
<i>*Senecio madagascariensis</i>	Fireweed	Asteraceae	2	2
<i>*Sonchus asper</i>	Prickly Sow Thistle	Asteraceae	1	
<i>*Stellaria media</i>	Common Chickweed	Caryophyllaceae	1	
<i>*Trifolium spp.</i>	Clovers	Fabaceae	2	2
GRASSES				
<i>*Anthoxanthum odoratum</i>	Sweet Vernal Grass	Poaceae	1	

Scientific name	Common name	Family	Abundance	
<i>*Axonopus fissifolius</i>	Carpet Grass	Poaceae	1	
<i>Bothriochloa macra</i>	Red-stem Grass	Poaceae	1-3	1-3
<i>*Briza sp.</i>	Quaking Grass	Poaceae	1	1
<i>*Cynodon dactylon</i>	Couch Grass	Poaceae	1	
<i>Dichelachne micrantha</i>	Common Plume Grass	Poaceae	1	
<i>Echinopogon ovatus</i>	Hedgehog Grass	Poaceae	1	
<i>*Eragrostis curvula</i>	African Lovegrass	Poaceae	1-2	1-5
<i>Eragrostis leptostachya</i>	Paddock Lovegrass	Poaceae	1-3	
<i>*Holcus lanatus</i>	Yorkshire Fog	Poaceae	1	
<i>Microlaena stipoides</i>	Weeping Grass	Poaceae	4-5	3
<i>*Paspalum dilatatum</i>	Paspalum	Poaceae	1	
<i>*Pennisetum clandestinum</i>	Kikuyu	Poaceae	1	
<i>Rytidosperma pilosum</i>	Wallaby Grass	Poaceae	1	
<i>*Sporobolus africanus</i>	Parramatta Grass	Poaceae		3
<i>Sporobolus elongatus</i>	Slender Rat's Tail Grass	Poaceae		3
<i>Themeda triandra</i>	Kangaroo Grass	Poaceae		0-3
<i>*Vulpia sp.</i>	Rat's Tail Fescue	Poaceae	3	3
GRAMINOIDS				
<i>Carex longibrachiata</i>	Bergalia Tussock	Cyperaceae	1	
<i>Juncus usitatus</i>	Common Rush	Juncaceae	1	

APPENDIX C SEVEN-PART TEST

Section 5A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) specifies seven factors to be taken into account in deciding whether a development is likely to significantly affect threatened species, populations or ecological communities, or their habitats, listed at the state level under the Threatened Species Conservation Act 1995.

The following Seven-part Test assesses the significance of the likely impacts associated with the proposed development on:

- Lowland Grassy Woodland EEC

a) *In the case of a threatened species, whether the action proposed 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.*

No threatened flora species were found to be present on the subject site, nor are any considered likely to occur there based on the type of habitat present and the degree of disturbance from past and present clearing, grazing and the use of the site as an airstrip.

Only four threatened bird species are considered to have potential to occur in the type of woodland habitat present on the site however it is unlikely that any of them would be present. Similarly, four threatened bat species could utilise the site, the Grey-headed Flying Fox if Rough-barked Apple and eucalypts on the site are flowering, and microbats which might forage within the woodland areas. The former would be uncommon seasonal visitors in summer and the latter would be unlikely to find any suitable breeding habitat and little roosting habitat due to the lack of hollow-bearing trees. While some trees may need to be removed for widening of the access road and construction of a perimeter road, none of them have hollows, and they constitute a very small proportion of the trees on the site. Therefore, no assessment of impacts has been done for any individual flora or fauna species.

b) *In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.*

No populations have been listed for the area under Part 2 of Schedule 1 of the TSC Act.

c) *In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:*

- 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***
- 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.***

The Endangered Ecological Community Lowland Grassy Woodland is present in moderate condition in the south-west corner of the site, outside the proposed development envelope. There are smaller patches along the access road from the highway, north of the entrance and around the existing aeroclub premises. These appear to have a slightly less diverse groundcover.

However, the grassland component of the EEC is not in particularly good condition, though being probably >50% native it would not qualify as being in "low" condition. Native forb diversity within the woodland is very low and no native forbs were seen in the treeless parts of the site.

The site carries an EEC (the woodland patches) which is in moderate-good condition.

The site is adjacent to a larger area of similar vegetation at least some of which would be in better condition, so the proposed development will not place the community at risk of local extinction, nor adversely modify its condition such as to place it at risk of local extinction.

The bulk of the construction will occur in treeless areas, which are sufficiently degraded by their long grazing history, are not considered not to fall within the "derived grassland" component of Lowland Grassy Woodland. It may be necessary to remove some trees in order to widen the access road from the highway from its current 4-5 metres to 6 metres wide, and seal it. The construction of an entirely new perimeter road

around the northern end of the north-south runway from the airstrip buildings to a point north-west of the runway intersection could require the removal of some trees if it is constructed close to the boundary fence. However, it would be possible to deviate around most of these.

The largest and most intact block of woodland on the site is excluded from the development envelope and would be available to offset clearing on the remainder of the site if needed. Potential exists to improve its condition by excluding livestock and encouraging some tree regeneration.

The removal of cattle will mean that the site will have to be slashed to keep grass cover from becoming too dense, and this has the potential to rapidly spread African Lovegrass, to the detriment of the woodland condition. This issue will need to be addressed in any management plan for the site.

d) In relation to the habitat of a threatened species, population or ecological community:

- i. the extent to which habitat is likely to be removed or modified as a result of the action proposed, and
- ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and
- iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

In the context of the total amount of Lowland Grassy Woodland EEC in the Frogs Hollow area, that occurring on this site would be a very small proportion.

The development will not cause significant fragmentation of the woodland as it is proposed to retain almost all of it, with some possible tree removal for road construction or widening.

The habitat of this EEC is extensive in the Bega Valley and the site is not of high significance for it as it contributes little to connectivity and is not of high quality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

No areas of declared critical habitat have been declared for the study area.

f) Whether the action proposed is consistent with the objectives or actions of a Recovery Plan or Threat Abatement Plan

There is no Recovery Plan for Lowland Grassy Woodland.

g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Four identified Key Threatening Processes (KTPs) are relevant to this proposal:

1. The clearing of native vegetation is listed as a Key Threatening Process, as 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'. Clearing can lead to direct habitat loss, habitat fragmentation and associated genetic impacts, habitat degradation and off-site impacts such as downstream sedimentation. The proposal will involve clearing of native vegetation, but will not contribute significantly to the operation of clearing as a threatening process at the local or regional level, since the site is already largely cleared and the remaining grassland degraded by past grazing history, and there are similar stands of remnant woodland on other properties within a kilometre or so of the site.
2. The invasion of native vegetation by exotic perennial grass is a further Key Threatening Process relevant to this proposal. African Love Grass is abundant already on the site and will undoubtedly continue to expand the area it occupies. This weed could be spread and other exotic grass species could be introduced on vehicles and machinery used on the site during construction. The disturbance associated with construction is likely to encourage proliferation of this weed. If livestock are removed from the site as a result of intensified use of the airstrip, then this may also have an effect on the groundcover, possibly encouraging some weeds and discouraging others.
3. Loss of Hollow-bearing Trees is listed as a Key Threatening Process. In NSW, terrestrial vertebrate species that are reliant on tree hollows for shelter and nests include at least 46 mammals, 85 birds, 32 reptiles and 16 frogs. Of these, 45 species are listed as threatened on Schedule 1 and Schedule 2 of the *Threatened Species Conservation Act*. Three hollow bearing trees were observed, however, no hollows

would need to be removed for widening of the access road or construction of the new perimeter road. It is intended that trees near the present aeroclub buildings will be retained.

4. Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners can result in poor tree health due to increased insect populations building up on the trees when populations of other insectivorous birds are driven out by Noisy Miners. There is some indication of this occurring on the site, with some of the trees in the early stages of dieback. It is unlikely that the proposed intensification of airstrip use and construction of new roads and buildings will make the site any more or less appealing to Noisy Miners, which have a very high level of tolerance for human disturbance.

Conclusion

This assessment concludes that some impact to the EEC Lowland Grassy Woodland will occur as a result of the proposed subdivision of this site, but the impact would be relatively minor as the site carries very little intact woodland, and even this is of low species diversity. The secondary grassland, while still dominated by native grasses, is also of low diversity and its loss would not be significant.