

**SEVEN PART TEST
ON THREATENED FLORA AND FAUNA**

for a
Proposed Rezoning

at

**Lot 22 DP582824 and Lot 221 DP823112
Bridgman & Retreat Roads
Singleton
NSW**

Prepared by:

Mungo Worth (MABS)

of

WILDTHING Environmental Consultants

38c Stapleton Street
WALLSEND NSW 2287
ABN: 41 033 509 215

For:

Mr. D. Geelan
ARD Developments Pty Ltd
PO Box 3063
SINGLETON NSW 2330

Job No: 11999

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1.0 INTRODUCTION

It is proposed that Lot 22 DP582824 and Lot 221 DP823112 Retreat Road, Singleton be rezoned to allow for the site to be subdivided into approximately 30 Rural Residential lots. This report is intended to indicate the likelihood of the development having a significant effect on threatened species of flora, fauna and ecological communities and to fulfil other requirements of the Environmental Planning and Assessment Act (EPA Act) 1979 and the Threatened Species Conservation Act (TSC Act) 1995. Consideration has also been afforded to the State Environmental Planning Policy 44 (SEPP 44) – ‘Koala Habitat Protection’ and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.

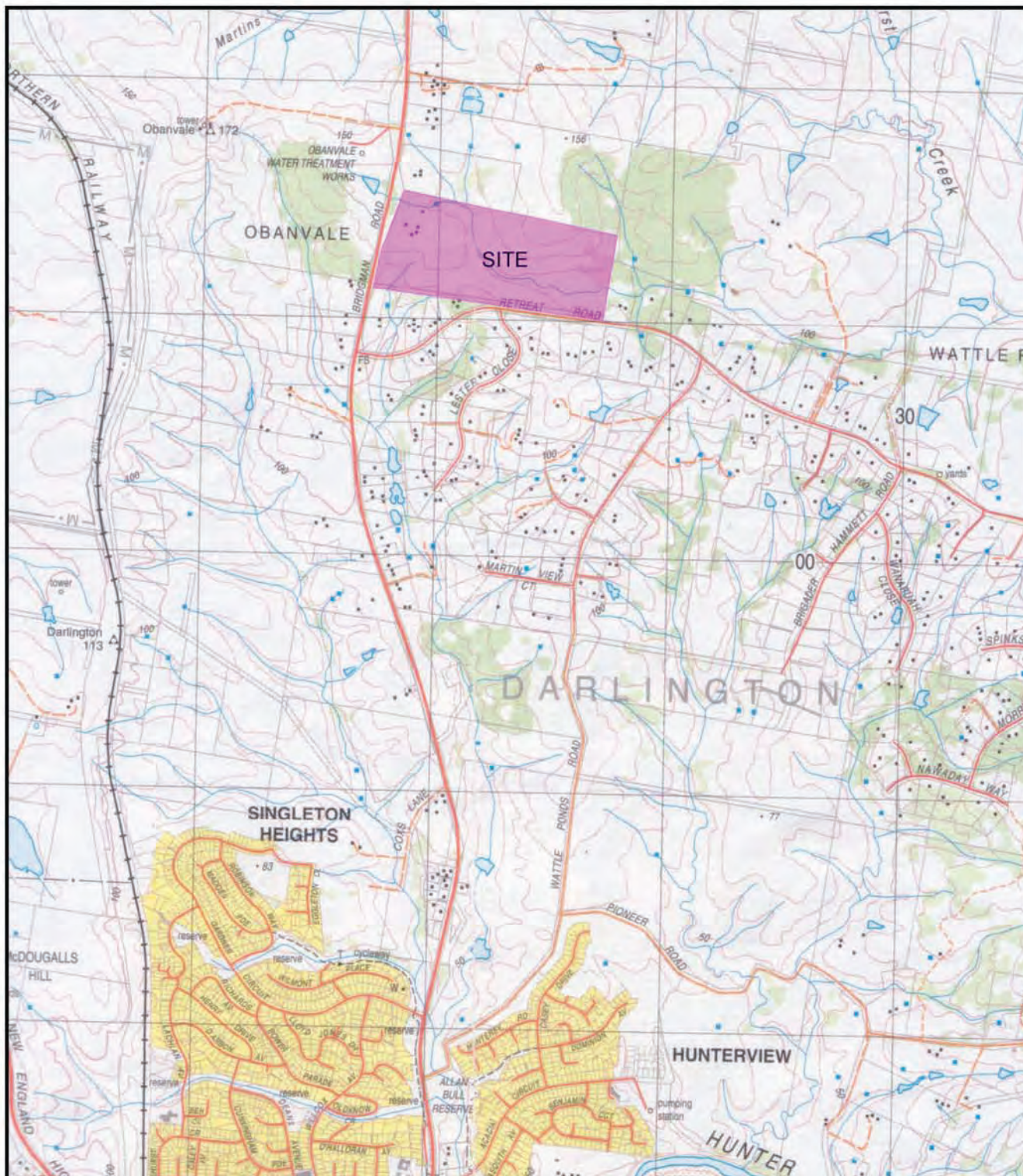
1.1 GENERAL DESCRIPTION OF THE SITE

Lot 22 DP582824 and Lot 221 DP823112, hereby collectively referred to as the site, are approximately 37 ha in size and are located on the northern side of Retreat Road, Singleton (Figure 1). The site is located within a 1(a) Rural-zoned area bordered by similar zoning on the north and west. The land to the south and east is zoned 1(d) Rural Small Holdings. An existing dwelling and sheds are located in the west of the site on the site’s frontage onto Bridgman Road.

The site slopes down on all sides to an ephemeral drainage line running through the site from the north-western corner to the eastern boundary. Native vegetation within the site primarily consisted of mature and juvenile Eucalypts. Canopy species present across the site included *Corymbia maculata* (Spotted Gum), *Eucalyptus crebra* (Narrow-leaved Ironbark) and *Eucalyptus fibrosa* (Broad-leaved Ironbark). The site has been subject to extensive vegetation clearance and grazing resulting in a largely cleared pasture community over the majority of the site with a high proportion of exotic species. An aerial photo of the site is shown in Figure 2.

1.2 DESCRIPTION OF THE DEVELOPMENT PROPOSAL

The proposal involves the rezoning of the site to allow rural-residential lots with adjoining roads expected to enter from Retreat Road. The existing dwelling in the west of the site will be retained on a larger lot retaining access from the Bridgman Road frontage. It is anticipated that a buffer on either side of the drainage line will be retained and vegetated to enhance visual amenity and ecological connectivity.



Source: LPI 1:25000 Topographic Map 9132-4N 'Singleton'

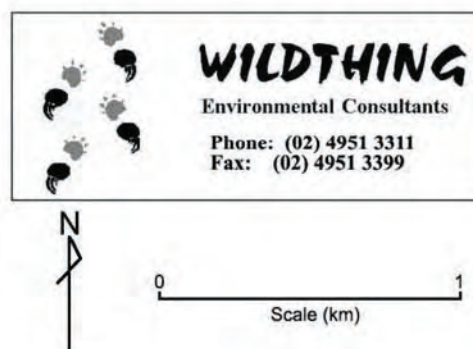
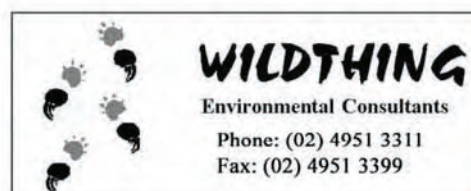


Figure 1: Location of the site



Source: Department of Lands (2010)



0 100 200
metres

Figure 2: Site Plan

2.0 SCOPE OF THE STUDY

This study was designed to address any likely flora and fauna issues of significance occurring upon the site. This was achieved by appraisal of the vegetation assemblage and structural formation, and identification of representative plant species of the various structural layers. Potential habitat offered by the vegetation present was also assessed. The possibility of this site being significant for any Schedule 1 and 2 (Endangered and Vulnerable) flora, fauna and ecological communities was paramount in the assessment process. Appraisal has been confined to the site and its immediate surroundings and both have been considered in the Section 5A assessment.

2.1 LEGISLATIVE REQUIREMENTS

This Seven Part Test Report has been structured upon the guidelines laid down in Section 5A of the Environmental Planning and Assessment Act (1979), and the Threatened Species Conservation Act (1995), which requires consideration of the impact of the proposed development upon any Schedule 1 and 2 (endangered or vulnerable) species and ecological communities expected or found on the site. Endangered and vulnerable species are collectively referred to as 'threatened' species in this report.

Also considered in this report is the Commonwealth Environment Protection and Biodiversity Conservation Act (1999). Assessments have been made to determine whether or not the proposal or activity will have a significant effect on a matter of National Environmental Significance. State Environmental Planning Policy (SEPP) 44 – 'Koala Habitat Protection' has also been considered.

Fieldwork was conducted under the NSW National Parks and Wildlife Service (NPWS) Scientific License S10475 – Mungo Worth. Fieldwork undertaken by Wildthing Environmental Consultants is also covered under Animal Care and Ethics Approval: Animal Research Authority Issue by the Director General of NSW Agriculture (File No. 08 – 361) for the Fauna Survey of Biodiversity and Impact Assessment.

3.0 METHODOLOGY

3.1 VEGETATION APPRAISAL METHODOLOGY

The initial determination of the basic vegetation community boundaries was undertaken through the review of an orthophoto covering the site. Following this, a detailed ground survey was conducted. The vegetation survey was undertaken in accordance with the Lower Hunter and Central Coast Region – Flora and Fauna Guidelines (Murray, *et al* 2002). Due to the high degree of disturbance to the vegetation communities on site flora searches were undertaken across the site in the manner described by Cropper (1993) as the ‘Random Meander Technique’. This involved walking in a random manner throughout the entire site, visiting the full range of potential habitats and checking every plant species seen. During this survey all species encountered were recorded as well as the physical attributes of the surrounding area.

A list of all flora species identified on site has been provided in Appendix B.

3.2 HABITAT APPRAISAL METHODOLOGY

Habitat may be defined as the physical and biological environment required for the survival of a specific population of a species. In modern usage habitat has also come to be regarded as an association of landform and plant life, which provides sustenance and shelter for a particular fauna assemblage.

The methodology of the habitat appraisal used the vegetation community data combined, where relevant, with geomorphological features and the occurrence of particular plant species or forms (i.e. tree hollows) to provide a basis for a subjective habitat assessment aimed at placing the ecological status of the site within a local perspective.

3.2.1 GENERAL HABITAT FOR NATIVE SPECIES

From the vegetation appraisal and a general inspection of the site and surrounding areas, a subjective assessment of the general habitat value of this site was made. Considered in this assessment were:

- occurrence of that habitat type in the general vicinity;
- degree of disturbance and degradation;
- area occupied by that habitat on site;
- continuity with similar habitat adjacent to the site, or connection with similar habitat off site by way of corridors; and
- structural and floral diversity.

3.2.2 HABITAT FOR THREATENED SPECIES

This site was evaluated as potential habitat for each of the threatened species reported on the Department of Environment, Climate Change and Water (DECCW) Database and the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) on-line Database from within 10km of the site. This evaluation was based on home-range, feeding, roosting, breeding, movement patterns and corridor requirements for fauna and hydrology, soil types, aspect and structural formation for flora species. Habitat descriptions for the species considered in this report are provided in Appendix A.

3.3 FAUNA APPRAISAL METHODOLOGY

The methodology adopted consisted of an assessment of the potential use of the site by any Schedule 1 and 2 fauna identified on the DECCW and the DSEWPaC Databases. This was undertaken by both appraising the extent of likely habitat upon the site, searches for secondary indications of threatened species utilising the site, and incidental observations of native fauna in general. No trapping was conducted due to the disturbed nature of the site which has involved the removal of virtually the entire understorey. The location of the fauna surveys on site is shown in Figure 3.

3.3.1 DIURNAL SURVEYS

Diurnal surveys were undertaken on the site and involved:

- avifauna surveys,
- herpetofauna searches, and
- searches for secondary indications of fauna presence.

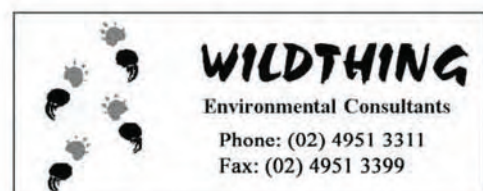
The surveys for diurnal avifauna species were conducted at peak activity periods (i.e. dawn and dusk) and involved identifying the birds seen and heard at one point during a 20-minute period. During this time, any birds encountered were identified directly, with the aid of commercially available avifaunal field guides. Incidental observations of avifauna during other surveys were also noted.

The herpetofauna searches included an amphibian search, which involved searches detecting frogs by either call or sight and subsequent identification via the use of dichotomous keys or the recording of calls and subsequent comparison with commercially available frog call recordings.

Diurnal searches for reptiles involved searching in likely habitat such as under leaf litter and fallen timber. During this time any reptiles encountered were identified directly, with the aid of dichotomous keys in conjunction with commercially available reptile field guides.



—— Spotlighting/anabat route



0 100 200
metres

Figure 3: Fauna survey locations

During the survey period opportunistic sightings of species and secondary indications (scats, scratches, diggings, tracks, nests etc.) of resident fauna were noted and included:

- searches for whitewash, prey remains and regurgitation pellets from Owls,
- checks for obvious nests of raptors such as the Osprey,
- investigation of any possible den sites for the Tiger Quoll,
- checking trees (particularly smooth-barked species) for scratches consistent with arboreal mammals, and
- searches for characteristic scats, such as from Koalas. Koala feed trees were targeted for specific Koala scat searches.

3.3.2 NOCTURNAL SURVEYS

Nocturnal surveys were undertaken across the site. The nocturnal surveys involved a total of 1.5 hours of spotlighting at a rate of 1km/hr conducted over one night using a 55W hand-held spotlight. The spotlighting survey involved both visual and auditory components (i.e. looking for eye shine and listening for faunal activity). A mobile microchiropteran bat call survey using an Anabat detector was undertaken in conjunction with the above spotlighting survey for a total of 90 continuous minutes. Any bat calls recorded were analysed using an Anabat Zero Crossing Analysis Interface feeding into a computer and identified by comparison with sample bat calls.

During the nocturnal avifauna and mammal survey pre-recorded calls of *Phascolarctos cinereus* (Koala) were broadcast through an amplification system designed to project the sound for at least 1km under still night conditions. An initial listening period of 10 minutes was undertaken, followed by 5 minutes of calls (repeated in four different directions). A period of two minutes of quiet listening was then employed after each 5-minute bracket of calls.

3.4 DATE, TIMES, ACTIVITIES & WEATHER CONDITIONS

A summary of the time spent on site during fieldwork and the prevailing weather conditions at the time is contained below in Table 1.

Table 1: Survey Dates, Times, Activities and Weather Conditions

DATE	TIME	ACTIVITY	WEATHER
26/11/10	1445 – 1700	Vegetation Survey Avifauna Surveys Herpetofauna searches Incidental observations	32°C, N breze, Cloud 7/8.
17/01/11	1730 – 1900	Spotlighting/Anabat Frog Survey	33°C, NW Breeze, Cloud 4/8.

3.5 THREATENED SPECIES

The following threatened species listed in Table 2 have been recorded on the DECCW database within 10km of the site or are considered to have potential habitat available within 10km according to the DSEWPoC on-line database (*).

Table 2: Threatened Species Considered.

Scientific Name	Common Name	TSC Act 1995	EPBC Act 1999
<i>Acacia pendula</i>	<i>Acacia pendula</i> in the Hunter catchment	E2	
* <i>Eucalyptus glaucina</i>	Slaty Red Gum	V	V
<i>Eucalyptus camaldulensis</i>	<i>Eucalyptus camaldulensis</i> population in the Hunter catchment	E2	
* <i>Thesium australe</i>	Austral Toadflax	V	V
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	E1	
<i>Erythrorhynchus radiatus</i>	Red Goshawk	E4A	
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V	
<i>Glossopsitta pusilla</i>	Little Lorikeet	V	
* <i>Lathamus discolor</i>	Swift Parrot	E	E
<i>Climacteris picumnus victoricae</i>	Brown Treecreeper (eastern subspecies)	V	
<i>Pyrrholaemus sagittatus</i>	Speckled Warbler	V	
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V	
<i>Petroica boodang</i>	Scarlet Robin	V	
<i>Petroica phoenicea</i>	Flame Robin	V	
* <i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	E
<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	V	
<i>Phascogale cinerea</i>	Koala	V	
* <i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V
<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	V	
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V	
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V	
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat	V	
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V	
<i>Myotis macropus</i>	Southern Myotis	V	
* <i>Nyctophilus timoriensis</i>	Eastern Long-eared Bat	V	V

E=Endangered Species

V=Vulnerable Species

E4A=Critically Endangered

E2=Endangered Population

4.0 RESULTS

4.1 FLORA ASSEMBLAGES

A general description of the flora assemblage identified on site is given below. A full list of the flora species recorded during fieldwork is listed in Appendix B. The distribution of the vegetation communities has been indicated in Figure 4*. The vegetation community descriptions mapped are consistent with the Map Units described in The Vegetation of the Central Hunter Valley (Peake, 2006).

*Note on Vegetation Community Distribution Map. A map of vegetation of any area seeks to describe the distribution of the plant species in that area by defining a number of vegetation units (assemblages or communities), which are relatively internally homogenous. Whilst such mapping is a convenient tool, it greatly oversimplifies the real situation. Plants rarely occur in defined communities with distinct boundaries. Accordingly vegetation units used for the accompanying map should be viewed as indicative of their extent rather than being precise edges of communities.

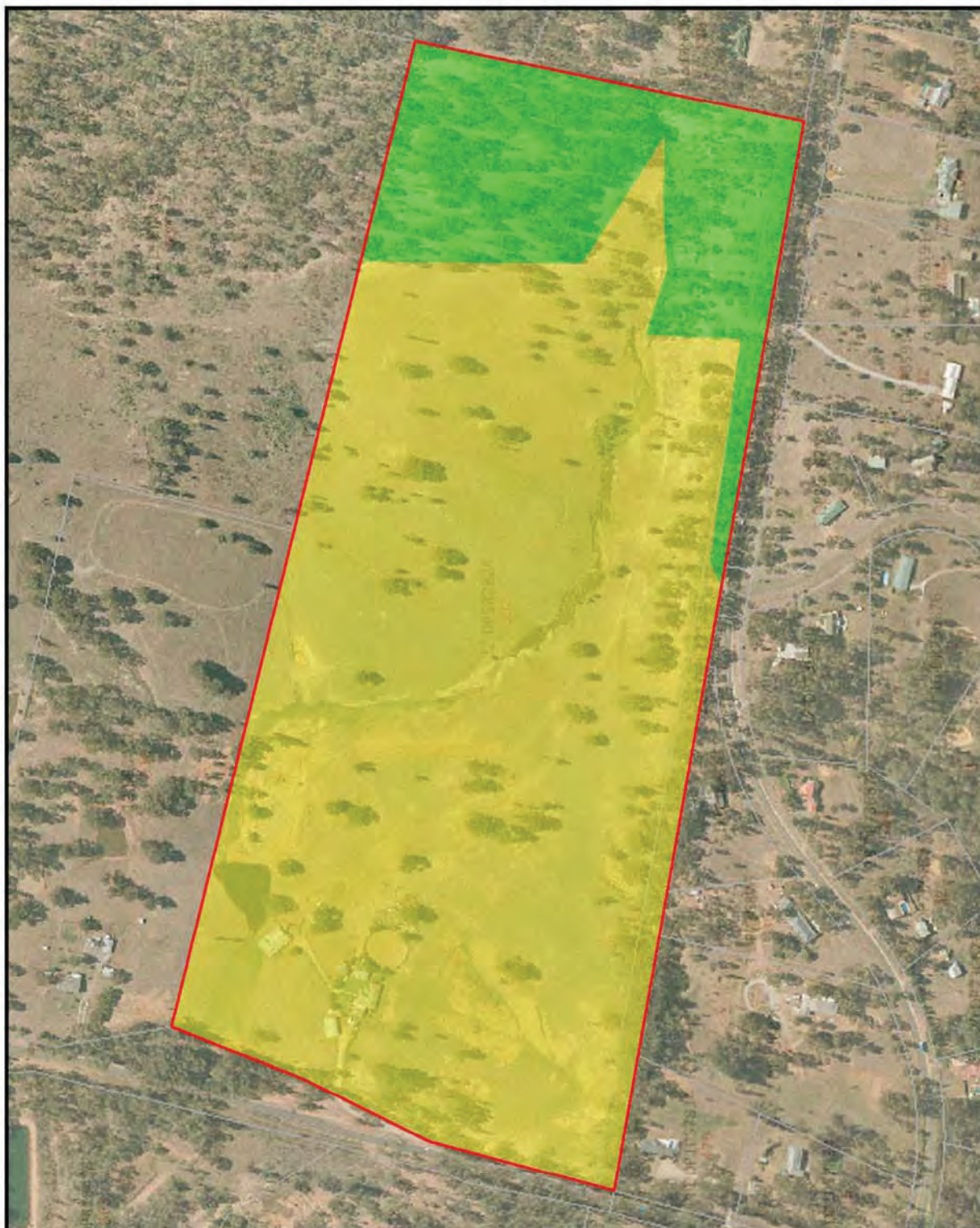
Central Hunter Spotted Gum – Ironbark Forest (CHSGIBF)

Approximately 6ha of Dry Sclerophyll Open Forest consistent with Map Unit 27 – Central Hunter Ironbark – Spotted Gum – Grey Box Forest was found to be present on site. This community was highly disturbed due to clearing and grazing resulting in a substantially reduced understorey.

The canopy was dominated by *Corymbia maculata* (Spotted Gum), *Eucalyptus fibrosa* (Broad-leaved Ironbark) and *Eucalyptus crebra* (Narrow-leaved Ironbark) with few other species present. The mid-storey of this community was absent. Understorey shrubs were also sparse to absent in most areas with isolated *Daviesia ulicifolia* ssp *ulicifolia* and *Allocasuarina luehmannii* (Bulloak) present in very small numbers. A number of *Olea europea* (European Olive) were also present within the understorey.

The ground cover across the site was generally restricted to pasture species due to grazing and included *Eragrostis brownii* (Brown's Love Grass), *Themeda australis* (Kangaroo Grass), *Aristida ramosa* (Three-awn Speargrass), *Digitaria sanguinalis* (Summer Grass), *Ozothamnus diosmifolium* (Everlasting), *Pratia purpurascens* (White Root), *Wahlenbergia gracilis* (Native Bluebell) and *Chrysocephalum apiculatum* (Yellow Buttons). Weed species *Senecio madagascariensis* (Fireweed) and *Hypochoeris radicata* (Cat's Ear) were common throughout the community with *Opuntia stricta* var. *stricta* (Prickly Pear) found sporadically throughout the assemblage.

Photos of this assemblage are shown in Figures 5 and 6.



-  Spotted Gum-Ironbark Forest
-  Cleared pasture with scattered trees

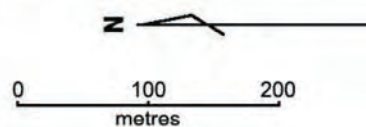
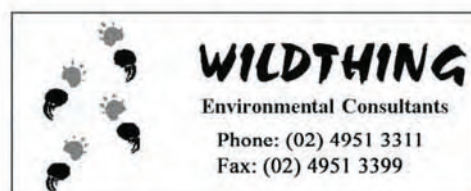


Figure 4: Vegetation communities



Figure 5: Spotted Gum - Ironbark Forest community in the south-eastern corner of the site.



Figure 6: Spotted Gum - Ironbark Forest community in the north-eastern corner of the site



Figure 7: Pasture community in the centre of the site looking north across the drainage line from the southern boundary.



Figure 8: Pasture community in the west of the site looking north-west.

Cleared Open Pasture

Cleared pasture covered the majority of the site and was composed of a mixture of native and introduced grasses and herbs. Native groundcover species were similar to those found within the Spotted Gum community including *T. australis*, *C. refractus* and *A. ramosa* however *Cynodon dactylon* (Common Couch) and introduced species such as *Senecio madagascariensis* (Fireweed) and *Paspalum dilatatum* (Paspalum) tended to be more common within the cleared areas. Scattered trees were generally remnant trees from the Spotted Gum community on site. A photo of this assemblage is shown in Figures 7 and 8.

A variation of this community was associated with the ephemeral drainage line through the centre of the site. Species common along the drainage line included *Viola hederacea* (Native Violet) and the introduced *Juncus acutus* ssp. *acutus* and *Rumex* sp. (Dock). A similar degree of disturbance to the remainder of the pasture community was apparent in most of the drainage line.

4.1.1 ENDANGERED AND LOCALLY SIGNIFICANT ECOLOGICAL COMMUNITIES

Based on the vegetation assessment, the Central Hunter Spotted Gum – Ironbark Forest concentrated in the eastern portion of the site was confirmed to be a disturbed remnant of Central Hunter Spotted Gum – Ironbark Forest in the Sydney Basin Bioregion, which is listed as an Endangered Ecological Community under the NSW Threatened Species Conservation Act 1995. The impact of the proposal on this Endangered Ecological Community is assessed in Section 5.0 of this report.

4.1.2 THREATENED PLANT SPECIES

Four threatened flora species together have been previously recorded within 10km of the site on the DECCW database or are considered to have potential habitat within 10km according to DSEWPoC on-line database (*).

Threatened Flora Species:

- | | | |
|-----------------------------------|--|----|
| • <i>Eucalyptus camaldulensis</i> | <i>Eucalyptus camaldulensis</i> population in the Hunter catchment | E2 |
| • <i>Acacia pendula</i> | <i>Acacia pendula</i> in the Hunter catchment | E2 |
| • <i>Eucalyptus glaucina</i> | Slaty Red Gum | V |
| • * <i>Thesium australe</i> | Austral Toadflax | V |

No threatened flora species were recorded on site during the survey, however some marginalised habitat was available for *A. pendula*, *E. glaucina* and *T. australe*. The impact of the proposal on these threatened flora species is discussed in more detail in Section 5.0 of this report.

Generally habitat within the site has been greatly marginalised by past and ongoing anthropogenic uses including grazing and clearing.

4.1.3 NOXIOUS WEEDS AND WEEDS OF STATE AND NATIONAL SIGNIFICANCE

One noxious weed species was found to be present within the site and is listed below in Table 3. The site lies within the jurisdiction of the Singleton Shire Council Noxious Plants Advisory Committee.

Table 3: Noxious Weed species found on site.

WEED SPECIES	WEED CLASS SINGLETON SHIRE COUNCIL	ADDITIONAL SIGNIFICANCE
<i>Opuntia stricta</i> var. <i>stricta</i> (Prickly Pear)	Class 4	

N – Weed of National Significance (Listed in the Commonwealth Government's National Weeds Strategy 1997)

T – Listed as a Threatening Process under the NSW TSC Act 1995.

Control Classes under the Noxious Weeds Act 1993.

Class 1 & 2	This plant must be eradicated from the land and the land must be kept free of this plant.
Class 3	This plant must be fully and continuously suppressed and destroyed.
Class 4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the LCA. Must also, 'not be sold, propagated or knowingly distributed'.
Class 5	The requirements of the Noxious Weeds Act 1993 for a notifiable weed must be complied with.

The incidence of Prickly Pear was relatively low across the site. It is recommended that ongoing weed control targeting Prickly Pear be conducted throughout the site to prevent it from becoming further established on site. The instances of *Olea europaea* ssp. *cuspidata* (African Olive) on site have been addressed in Section 5.0 of this report.

4.2 HABITAT APPRAISAL

4.2.1 HABITAT DESCRIPTION AND DISTRIBUTION IN THE VICINITY

Three broad habitat categories, Dry Sclerophyll Forest, Open Grassland and Drainage line were identified within the site.

Dry Sclerophyll Forest

Dry Sclerophyll Forest with a modified understorey was present mainly in the east of the site. The canopy was composed of a number of myrtaceous species such as *Corymbia maculata* (Spotted Gum), *Eucalyptus fibrosa* (Broad-leaved Ironbark), and *Eucalyptus crebra* (Narrow-leaved Ironbark), which provide blossom for nectivorous species (i.e. Gliders, Possums, Flying-foxes, Honeyeaters and Lorikeets). These tree species also provide a foraging resource for insectivorous species such as Thornbills, Fantails and Sittellas. Nesting opportunities are provided throughout the forest for bird species that nest in small to medium tree hollows and those which construct nests on branches. Hollow-bearing trees would also provide nesting/roosting habitat for other hollow dependent fauna species such as Possums, Gliders and Microchiropteran Bat species.

The shrub layer was generally absent reducing the quality of habitat throughout this community. The grassy ground layer would give refuge to a number of reptile species however the grazed nature of the grass would exclude most small mammal species. There is also a lack of fallen and felled timber and branches which is a required resource for many smaller fauna species that require cover.

Grassland/Pasture

The Grassland/Pasture habitat, a result of past clearing and continued grazing, was composed of a mixture of native and introduced grasses. Such habitat provides opportunity for a variety of avifauna, including predominantly terrestrial species preferring open spaces such as Pipits, seed eating birds and several birds of prey, which may hunt over this area in search of potential prey species. Macropods may also frequent such areas whilst grazing. Some species of bats may also forage over this cleared area for insects. However, the lack of vegetative cover often limits the value of such areas for many species, particularly some reptiles, small mammals and birds which are vulnerable to predation in open spaces.

Drainage Line

The ephemeral drainage line was located along the centre of the site within the cleared pasture area. This drainage line contained several pools fringed primarily by sedges and immature canopy species. This would offer aquatic habitat for a small variety of frogs and reptiles and provide a source of drinking water for native species such as macropods.

4.2.2 HABITAT FOR THREATENED SPECIES

An assessment of habitat attributes on site has been undertaken for the threatened species listed in Section 3.5. The results of the assessment are displayed in Table 5. Those species identified in this assessment as having potential habitat available on site have been considered further under Section 5A of the EPA Act in Section 5.0 of this report. The description of the ecology of each species is contained in Appendix A.

Table 5: Habitat Assessment for Threatened Species

	STATUS	HABITAT DESCRIPTION AND LOCALLY KNOWN POPULATIONS	LIKELIHOOD OF OCCURRENCE ON SITE
<i>Acacia pendula</i> <i>Acacia pendula</i> in the Hunter catchment	TSC Act- E2	The Hunter population of this species typically occurs on heavy soils, sometimes on the margins of small floodplains, but also in more undulating locations.	Low Habitat was available for this species particularly within the drainage line however this is marginalised by the high degree of disturbance and the distance from known populations.
<i>Eucalyptus glaucina</i> Slaty Red Gum	TSC Act-V	The Slaty Red Gum principally occurs in the Casino area in northern NSW and from Gloucester to Broke, in mid-northern NSW. It grows mostly on gentle slopes near drainage lines in alluvial and clayey soils, in open forest.	Low Habitat was available for this species particularly in and around the drainage line however this is marginalised by the high degree of disturbance.
<i>Eucalyptus camaldulensis</i> River Red Gum (Endangered Population)	TSC Act- E2	Endangered population in the Hunter Valley Catchment. Occurs from the west at Bylong, south of Merriwa, to the east at Hinton, on the bank of the Hunter River. May occur with <i>Eucalyptus tereticornis</i> , <i>Eucalyptus melliodora</i> , <i>Casuarina cunninghamiana</i> subsp. <i>cunninghamiana</i> and <i>Angophora floribunda</i> .	Unlikely No habitat is considered to be present on site due to the high degree of disturbance and the lack of associated soil and vegetation types.
<i>Thesium australe</i> Austral Toadflax	TSC Act-V	This species occurs in grassland and woodlands, often in damp areas from south-east Queensland through to Victoria and Tasmania associated with <i>Themeda triandra</i> (Kangaroo Grass).	Low The site provides some degree of habitat for this species however it is severely limited by the high degree of disturbance.
<i>Ephippiorhynchus asiaticus</i> Black-necked Stork	TSC Act-E	Inhabits swamps associated with river systems and large permanent pools but sometimes appears on the coast or in estuaries. It has also been recorded on farm dams and sewage treatment ponds.	Low The farm dam in the west of the site may provide some habitat for this species.
<i>Erythrorhynchus radiatus</i> Red Goshawk	TSC Act – E4A	Found in coastal, subcoastal forests, tropical woodlands typically north of the QLD border. Formerly found as far south as Sydney but now rarely seen below QLD border.	Low Habitat was available for this species across the site however this is marginalised by the high degree of disturbance and the distance from known populations and the site's location outside the typical range of this species.
<i>Callocephalon fimbriatum</i> Gang-gang Cockatoo	TSC Act-V	Tall montane forests and woodlands in mature wet sclerophyll forests. Requires hollows in which to breed between October and January.	Low Some marginal seasonal foraging habitat was present within the trees on site.
<i>Glossopsitta</i>	TSC Act-V	Tall Open Forests, woodlands,	Moderate

SPECIES	STATUS	HABITAT DESCRIPTION AND LOCALLY KNOWN POPULATIONS	LIKELYHOOD OF OCCURRENCE ON SITE
<i>pusilla</i> Little Lorikeet		orchards, parks and street trees.	Foraging and suitable nesting habitat was present within the areas of Open Forest on site.
<i>Lathamus discolor</i> Swift Parrot	TSC Act-E	The Swift Parrot is a winter visitor to the mainland, preferring open forest to woodland. The preferred winter food species are <i>Eucalyptus sideroxylon</i> (Red Ironbark), <i>E. albens</i> (White Box), <i>E. ovata</i> (Swamp Gum), <i>E. robusta</i> (Swamp Mahogany) and <i>E. melliodora</i> (Yellow Gum). They have also been observed eating the seeds and flowers of <i>Xanthorrhoea</i> spp. (Grass Trees).	Low Marginal habitat is available for this species due to the lack of preferred <i>Eucalyptus</i> species and the high degree of disturbance to the vegetation community on site.
<i>Pyrholaemus sagittatus</i> Speckled Warbler	TSC Act-V	Speckled Warblers live in a wide range of eucalypt-dominated vegetation that has a grassy understorey, often on rocky ridges or in gullies. It builds a domed nest of grass, bark shreds and moss, lined with fur on the ground.	Low Habitat was present within the area of Spotted Gum – Ironbark Forest although this was considered marginal due to the disturbed nature of the understorey.
<i>Pomatostomus temporalis</i> ssp. Grey-crowned Babbler	TSC Act-V	Open forest, woodland, scrubland, farmland and outer suburbs. Prefers woodlands with regenerating trees, tall shrubs, and an intact ground cover of grass and forbs.	High Foraging and suitable nesting habitat was present within the areas of Spotted Gum – Ironbark Forest on site.
<i>Petroica boodang</i> Scarlet Robin	TSC Act-V	Primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. This species lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. Habitat usually contains abundant logs and fallen timber and these are important components of its habitat.	Low Habitat was present within the trees on site although this was considered marginal due to the disturbed nature of the understorey.
<i>Petroica phoenicea</i> Flame Robin	TSC Act-V	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes, preferring clearings and open understories. In winter lives primarily in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees.	Moderate-High The site provides suitable wintering habitat for this species.
<i>Dasyurus maculatus</i> ssp. <i>maculatus</i> Tiger Quoll	TSC Act-V EPBC Act-E	Inhabits sclerophyll forests, rainforests and coastal woodlands. Nests are made in rock caves and hollow logs or trees, and basking sites are usually found nearby.	Low Only marginal hunting habitat was present due to a lack of suitable den sites and this species is usually found within higher quality remote habitat.
<i>Phascogale tapoatafa</i> Brush-tailed Phascogale	TSC Act-V	Sparsely distributed outside the semi-arid zone in dry sclerophyll forest and monsoonal forest and woodland.	Low-Moderate Habitat was considered to be present for this species within the area of Spotted Gum – Ironbark Forest.
<i>Phascolarctos cinereus</i> Koala	TSC Act-V	Coastal woodland and open forest containing suitable food trees.	Low A small number of <i>Eucalyptus tereticornis</i> were present on site.

SPECIES	STATUS	HABITAT DESCRIPTION AND LOCALLY KNOWN POPULATIONS	LIKELYHOOD OF OCCURRENCE ON SITE
			These trees were largely located in the south-east of the site and offered limited connectivity to other habitat areas.
<i>Pteropus poliocephalus</i> Grey-headed Flying-Fox	TSC Act-V EPBC Act-V	Wet and Dry Sclerophyll Forests, Rainforest, Mangroves and Paperbark swamps and Banksia Woodlands.	Moderate-High Suitable foraging habitat was present primarily within the area of Spotted Gum – Ironbark Forest on site.
<i>Mormopterus norfolkensis</i> East Coast Freetail-bat	TSC Act-V	This species appears to live in Sclerophyll Forests and Woodland. Roosts in tree hollows or under loose bark.	Moderate Suitable hunting and roosting habitat was present within the site.
<i>Falsistrellus tasmaniensis</i> Eastern False Pipistrelle	TSC Act-V	Inhabits sclerophyll forests and has been observed roosting in holes and hollow trunks of Eucalypts.	Moderate Suitable hunting and roosting habitat was present within the site.
<i>Saccolaimus flaviventris</i>	TSC Act-V	Has been reported from a wide variety of habitats. Roosts in tree hollows, animal burrows, dry clay cracks, under rock slabs and in abandoned Sugar Glider nests.	Moderate Suitable hunting and roosting habitat was present within the site.
<i>Miniopterus schreibersii</i> ssp. <i>oceanensis</i> Large Bentwing-bat	TSC Act-V	Wet and Dry Tall Open Forest, Rainforest, Monsoon Forest, Open Woodland, Paperbark Forests and Open Grasslands; caves or similar structures for roosting. It occasionally uses tree hollows.	Moderate Suitable hunting habitat was present on site.
<i>Scoteanax rueppellii</i> Greater Broad-nosed Bat	TSC Act-V	Tree-lined creeks, woodland/clearing ecotones and rainforest creeks, roosting mainly in tree hollows.	Moderate Suitable hunting and roosting habitat was present within the site.
<i>Myotis macropus</i> Southern Myotis	TSC Act-V	Various habitats of the coast and adjacent ranges with suitable waterbodies for hunting; caves or similar structures for roosting. It occasionally uses tree hollows.	Moderate Limited preferred hunting habitat in the form of very small areas of surface water was present within the drainage line. The site was found to lack preferred roosting habitat, however secondary roosting habitat in the form of tree hollows was present.
<i>Nyctophilus timoriensis</i> Eastern Long-eared Bat	TSC Act-V	Dry woodland and shrubland in arid and semi-arid regions. Roosts in tree hollows, fissures in branches or under dried sheets of bark.	Moderate Suitable hunting and roosting habitat was present within the site.

4.3 FAUNA APPRAISAL RESULTS

A full list of fauna species observed during the survey is contained in Appendix C.

4.3.1 DIURNAL SURVEYS

A number of avifauna species were identified on site during the survey including *Gymnorhina tibicen* (Magpie), *Strepera graculina* (Pied Currawong), *Chenonetta jubata* (Australian Wood Duck), *Manorina melanocephala* (Noisy Miner), *Grallina cyanoleuca* (Magpie-lark) and *Cacatua roseicapilla* (Galah).

No threatened avifauna species were recorded within the site during diurnal surveys.

A full list of the birds identified during the fieldwork is listed in the Fauna Species List in Appendix C.

Lampropholis delicata (Grass Skink) was the only species of reptile observed during the survey. No amphibian species were heard calling or observed within the vicinity of the site during fieldwork.

4.3.2 NOCTURNAL SURVEYS

A single *Trichosurus vulpecula* (Common Brushtail Possum) was observed on site during spotlighting. This species is not recognised as threatened under the Threatened Species Conservation Act (1995) or the Environment Protection and Biodiversity Conservation Act (1999). No other native species were observed during spotlighting.

The majority of calls recorded during the bat call survey were identified as belonging to *Chalinolobus gouldii* (Gould's Wattle Bat). A limited number of calls were attributable to the genus *Vespertilio* and were most likely to be from either *V. pumilus* (Eastern Forest Bat) or *V. vulturinus* (Little Forest Bat), which are common in the local area. *Nyctinomus australis* (White-striped Mastiff Bat) was also heard calling in the vicinity of the site. None of these species are listed as threatened under the TSC Act (1995).

Also there were:

- No characteristic scats of Koala noted,
- No obvious raptor nests noted, and
- No whitewash, regurgitation pellets or prey remains consistent with Owls noted.

5.0 CONSIDERATIONS UNDER SECTION 5A OF THE EPA ACT

Considerations of the effects of the proposed development under the guidelines of Section 5A of the Environmental Planning and Assessment Act (1979) for the concerned threatened species is given below. The species dealt with are those identified during the fieldwork and those identified as having potential habitat available on site in Section 4.2.2. Descriptions of the ecology of these species are given in Appendix A.

For the purposes of the Environmental Planning and Assessment Act 1979 and, in particular, in the administration of Sections 78, 79 and 112, the following factors have been taken into account in deciding whether there is likely to be a significant effect on this threatened species, populations or ecological communities, or their habitats:

- 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 despite targeted and incidental surveys. Marginal habitat was considered to be present for *Eucalyptus glaucina* (Slaty Red Gum) and *Thesium australe* (Austral Toadflax), particularly around the drainage line area. The proposed subdivision may result in the removal of a small amount of marginal habitat but given the low likelihood of occurrence on site this action is considered unlikely to have a significant adverse effect on the life cycle of any viable local population of this species.

No threatened fauna species were recorded during the survey. All of the 20 threatened fauna species considered in this report were considered to have potential habitat resources of varying quality available within the site:

<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork
<i>Erythrotriorchis radiatus</i>	Red Goshawk
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo
<i>Glossopsitta pusilla</i>	Little Lorikeet
<i>Pyrrholaemus sagittatus</i>	Speckled Warbler
<i>Lathamus discolor</i>	Swift Parrot
<i>Pomatostomus temporalis</i> ssp. <i>temporalis</i>	Grey-crowned Babbler
<i>Petroica boodang</i>	Scarlet Robin
<i>Petroica phoenicea</i>	Flame Robin
<i>Dasyurus maculatus</i>	Tiger Quoll
<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale
<i>Phascogale cinerea</i>	Koala
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox
<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle
<i>Saccolaimus flaviventris</i>	Greater Broad-nosed Bat
<i>Miniopterus schreibersii</i> ssp. <i>oceanensis</i>	Large Bentwing-bat
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat
<i>Myotis macropus</i>	Southern Myotis
<i>Nyctophilus timorensis</i>	Eastern Long-eared Bat

Although the site contributes to the habitat of the above species it is unlikely that any of the flora and fauna considered would be solely dependent upon the limited resources available on site. Whilst the proposal may be viewed as an incremental decline of habitat for these species in the local area the proposal is unlikely to have an adverse effect on any of the considered species such that a local population is placed at risk of extinction.

Provided the recommendations throughout this report are implemented the proposed subdivision is unlikely to have an adverse effect on the life cycle of any species addressed such that a viable local population is likely to be placed at risk of extinction.

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 incidence of any endangered populations have been recorded on site or within the local area. Habitat for *Acacia pendula* on site was marginalised by the high degree of disturbance to the lower vegetation layers. Therefore the proposal is unlikely to have a significant impact upon any local population of this species.

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

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.*

The majority of vegetation located in the north-east of the site and fringing the south-eastern boundary (6ha) is consistent with the Endangered Ecological Community 'Central Hunter Spotted Gum – Ironbark Forest (CHSGIF) in the Sydney Basin Bioregion', which is listed under Part 3 of Schedule 1 of the Threatened Species Conservation Act (TSC Act, 1995). Disturbances such as past vegetation clearance, weed incursion and ongoing grazing by livestock have left this community in relatively poor condition with no shrub layer and modified ground cover. Canopy species consistent with this community are also scattered through the cleared pasture community.

Depending on the positioning of future building envelopes within the eastern portion of the site a number of these canopy trees may need to be removed although the majority of proposed building envelopes are expected to be located within the already cleared area presently covering most of the

site. To mitigate any loss of this EEC on site it is recommended that appropriate areas of cleared land outside the development footprints such as the drainage line be used where appropriate to replant with species consistent with CHSGIF so that no net loss of this community is achieved. It is also recommended that plants consistent with CHSGIF be utilised for landscaping on site. As it is the proponent's stated intention to retain and revegetate a buffer around the drainage line through the centre of the site considerable scope for replacement and enhancement of CHSGIF exists within this buffer zone.

It is likely that the clearing associated with any proposed building envelopes in the east of the site will contribute to the incremental decline in the occurrence of this community in the Singleton Shire Council area. However given the recommendation to utilise species consistent with CHSGIF in replanting and landscaping within the drainage line buffer and other cleared areas on site the proposal is unlikely to result in a significant loss of this community such that its local occurrence is placed at risk of extinction.

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

A small area of CHSGIF may need to be removed to accommodate building envelopes in the east of the site subsequent to subdivision however it is recommended that where possible cleared land (particularly in the vicinity of the drainage line) be replanted with species consistent with CHSGIF resulting in no net loss.

Additionally, it is recommended that the removal of habitat features such as hollow-bearing trees be avoided where possible. If any habitat trees require removal it is recommended that a suitably qualified ecologist be on hand to supervise their removal to reduce the impact on any fauna species which may be present. To mitigate the loss of hollows it is also recommended that nest boxes of similar habitat value be installed at a ratio of 2:1 (2 nest boxes installed for each hollow removed) prior to any clearing taking place within the surrounding trees on site. Provided these recommendations are implemented and given the small amount of habitat to be impacted the proposal is unlikely to have an adverse effect on the life cycle of this vegetation community or the habitat it provides.

(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

Habitat on site is unlikely to become fragmented any further or isolated from other areas of habitat as a result of the proposal. The proposed revegetation of the drainage line buffer can be used to ameliorate any loss of habitat within proposed building envelopes.

- (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.*

The proposal may result in the removal of some CHSGIF for building envelopes, Asset Protection Zones and access. Provided at least an equivalent area of vegetation is replanted with species consistent with CHSGIF within the cleared areas on site the proposal is likely to result in a no net loss of vegetation. Given this recommendation and with similar habitat common on adjoining properties the proposal is unlikely to remove habitat important to the long-term survival of threatened species or ecological communities in the local area.

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

None of the site has been designated 'critical habitat' under Part 3 of the TSC Act.

- f) *whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.*

The Recovery Plan for the Grey-headed Flying-fox recommends the retention of preferred foraging species. The proposal is expected to result in the removal of a relatively small amount of foraging habitat for this species but is unlikely to significantly compromise the Recovery Plan given the abundance of habitat in the local area.

No Recovery or Threat Abatement Plan has been developed for the remaining addressed species. However DECCW has prepared Priority Action Statements (PAS) to promote the recovery of these species and the abatement of key threatening processes in NSW. The Priority Action Statements identified a number of broad strategies to help the EEC and species recover in NSW. Given the recommendation to replant cleared areas on site and control and manage weeds, particularly *Opuntia stricta* var. *stricta* (Prickly Pear), it is considered that the proposal does not significantly conflict with the PAS for these species or EEC.

- 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.*

The 'Key Threatening Processes' currently listed under Schedule 3 of the TSC Act that are relevant to the site have been listed below in Table 6.

Table 6: Key Threatening Processes.

	Applicability in regards to the site
Clearing of Native Vegetation	The clearing of vegetation is listed as a major factor contributing to the loss of biological diversity. The removal of native vegetation on site may be viewed as being part of this Key Threatening Process (KTP). It is recommended that clearing of this community on site be avoided where possible, however the use of species consistent with CHSGIF in the replanting of cleared areas and landscaping of the site would help offset any removal of vegetation on site.
Loss of hollow-bearing trees	If any habitat trees require removal it is recommended that a suitably qualified ecologist be on hand to supervise their removal to reduce the impact on any fauna species which may be present. To mitigate the loss of hollows it is also recommended that nest boxes of similar habitat value be installed at a ratio of 2:1 (2 nest boxes installed for each hollow removed) prior to any clearing taking place within the surrounding trees on site.
Invasion of native plant communities by exotic perennial grasses	Introduced grasses were common throughout the site. Further invasion by exotic grasses into the CHSGIF is unlikely given the already highly disturbed understorey and presence of horses.
Invasion of Native Plant Communities by <i>Lantana camara</i> (Lantana)	No Lantana was found to be present on site.
Invasion of Native Plant Communities by <i>Chrysanthemoides monilifera</i> (Bitou Bush & Boneseed)	No Boneseed was found to be present on site.
Invasion of Native Plant Communities by <i>Olea europea</i> ssp. <i>cuspidata</i> (African Olive)	This species was recorded on site. It is recommended that ongoing weed control targeting African Olive be conducted throughout the site to prevent it from becoming further established on site.
Removal of dead wood and dead trees	The understorey was extensively cleared and grazed and contained very little dead wood. This is unlikely to change as a result of the proposal.
Predation by the Feral Cat <i>Felis catus</i>	No cats were observed on site. The proposal is unlikely to increase feral numbers of this species.
Predation by the European Red Fox <i>Vulpes vulpes</i>	The Red Fox was not observed on site during fieldwork although is likely to be having an impact on local fauna. The proposal is unlikely to increase numbers of this species.
High frequency fire resulting in the disruption of life cycle processors in plants and animals and loss of vegetation structure and composition	The proposal is unlikely to result in a higher incidence of fire activity on site.
Infection of native plants by <i>Phytophthora cinnamomi</i>	This infection is not known to occur within the study area. The proposal may increase the risk of this infection being introduced to the site. During construction it is recommended that all machinery and vehicles entering the site be cleaned of contaminants

Key Threatening Process	Applicability in regards to the site
	prior to entering the site.
Predation by <i>Gambusia holbrooki</i> (Plague Minnow)	This species of fish was not observed within the drainage lines during the survey. The proposal is not likely to further exacerbate the predation by this fish on frog eggs and tadpoles.
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis.	The proposal is unlikely to cause any further infections of this disease.

6.0 CONSIDERATIONS UNDER SEPP 44 – ‘KOALA HABITAT PROTECTION’

The principal aim of State Environment Planning Policy 44 - Koala Habitat Protection is to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and to reverse the current trend of Koala population decline.

This policy applies to areas of more than one hectare or an area which has together with any adjoining land in the same ownership an area of more than 1 hectare, whether or not the development application applies to the whole, or only part of the land. In addressing SEPP44 there are two questions to be considered regarding the occurrence of ‘Potential’ and ‘Core’ Koala Habitat on site.

6.1 FIRST CONSIDERATION - IS THE LAND ‘POTENTIAL KOALA HABITAT’?

‘Potential Koala Habitat’ is defined in SEPP44 as, “...an area of native vegetation where trees of the type listed in Schedule 2 (Koala feed tree species) constitute at least 15% of the total number of trees in the upper or lower strata of the tree component”.

A limited number of *Eucalyptus tereticornis* (Forest Red Gum) were noted, particularly within the south-eastern corner of the site. These trees were found to constitute less than 15% of the trees within this area of the site and of the site as a whole. Therefore the site does not constitute ‘Potential Koala Habitat’ and accordingly no further provisions of this policy apply.

7.0 CONSIDERATIONS UNDER THE COMMONWEALTH ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

Considerations have been made to the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act 1999. Assessments have been made to determine whether or not the proposal or activity has, will have, or is likely to have a significant impact on a matter of National Environmental Significance. The matters of National Environmental Significance and the appropriate responses are listed below:

- *World Heritage properties;*

The proposed development does not affect any World Heritage properties.

- *wetlands recognised under the Ramsar convention as having international significance;*

The site does not have any impact or occur in proximity to a Ramsar listed wetland.

- *listed threatened species and communities;*

Twenty nationally threatened species were recorded on the DSEWPoC on-line database as occurring or having potential habitat available within 10km of the site, these being:

<i>Anthochaera phrygia</i>	Regent Honeyeater
<i>Lathamus discolor</i>	Swift Parrot
<i>Rostratula australis</i>	Australian Painted Snipe
<i>Litoria aurea</i>	Green and Golden Bell Frog
<i>Litoria booroolongensis</i>	Booroolong Frog
<i>Mixophyes balbus</i>	Stuttering Frog
<i>Mixophyes iteratus</i>	Southern Barred Frog
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat
<i>Dasyurus maculatus maculatus</i>	Spot-tailed Quoll
<i>Nyctophilus timoriensis</i>	Greater Long-eared Bat
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby
<i>Pseudomys novaehollandiae</i>	New Holland Mouse
<i>Pseudomys oralis</i>	Hastings River Mouse
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox
<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid
<i>Eucalyptus glauca</i>	Slaty Red Gum
<i>Euphrasia arguta</i>	
<i>Prasophyllum sp. Wybong</i>	Leek-orchid
<i>Pterostylis gibbosa</i>	Illawarra Greenhood
<i>Thesium australe</i>	Austral Toadflax

Under the EPBC Act Policy Statement 1.1 – Significant Impact Guidelines an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of an important population of a species;
- reduce the area of occupancy of an important population;

- fragment an existing important population into two or more populations;
- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of an important population;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;
- introduce disease that may cause the species to decline; or
- interfere substantially with the recovery of the species.

No nationally threatened species were recorded within the site during the survey. Habitat of mostly marginal quality was only present for *Eucalyptus glaucina*, *Thesium australe*, *Lathamus discolor*, *Anthochaera phrygia*, *Dasyurus maculatus* ssp. *maculatus*, *Pteropus poliocephalus*, *Chalinolobus dwyeri* and *Nyctophilus timoriensis*. All nationally listed species that were considered to have habitat on site have been addressed either under the provisions of state legislation (i.e.: Section 5A of the NSW Environmental Planning and Assessment Act 1979) or below as migratory species. As stated within Section 5.0, the proposal will lead to a small incremental loss of habitat within the locality, however it is not considered to be locally significant.

- *migratory species protected under international agreements;*

A number of migratory species were recorded on the DSEWPaC's on-line database as occurring or having potential habitat available within 10km of the site. *Lathamus discolor* has been assessed as a threatened species within Section 5.0 of this report. No listed migratory species were recorded during the survey.

Each of the remaining species has been assessed below in Table 7.

Table 7: Assessment of Migratory Species.

Scientific Name	Habitat	Possibility of occurrence & impact of action
Migratory Terrestrial Species		
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle	Considered to be a migratory species, however any movements are likely to be nomadic rather than migratory, in response to food availability	This species was considered unlikely to utilise the site.
<i>Hirundapus caudacutus</i> White-throated Needletail	Inhabits the airspace above forests, woodlands, farmlands, plains, lakes, coasts and towns.	Due to the general habitat requirements of the White-throated Needletail it is considered unlikely that the proposal will adversely impact upon this species.
<i>Merops ornatus</i> Rainbow Bee-eater	Inhabits areas such as open woodlands with sandy soils, sandridges, riverbanks, beaches, dunes, cliffs and rainforests.	Suitable foraging habitat was contained within the site however no suitable nesting habitat was present. The

Scientific Name	Habitat	Possibility of occurrence & impact of action
		proposal is unlikely to impact upon this species.
<i>Monarcha melanopsis</i> Black-faced Monarch	Utilises a range of habitats including rainforests, eucalypt woodlands, coastal scrubs (Pizzey & Knight, 2001).	Due to its general habitat requirements it is unlikely that the proposal will adversely impact upon this species.
<i>Myiagra cyanoleuca</i> Satin Flycatcher	Heavily vegetated gullies in forests and taller woodlands. During migration this species also utilises coastal forests, woodlands, mangroves, remnant trees in paddocks and gardens (Pizzey & Knight, 2001).	Due to its general habitat requirements, it is unlikely that the proposal will adversely impact upon this species.
<i>Rhipidura rufifrons</i> Rufous Fantail	Utilises a range of habitats including rainforests, wet sclerophyll forests, monsoon forests, scrubs, mangroves, watercourses, parks and gardens. During migration this species also utilises farms, street trees and buildings (Pizzey & Knight, 2001).	Due to the general habitat requirements of this species during migration, it is unlikely that the proposal will adversely impact upon this species.
<i>Anthochaera phrygia</i> Regent Honeyeater	This species is found in Open Forests and Woodlands, particularly in blossoming eucalypts and mistletoe.	No habitat is present on site within the Rainforest.
Migratory Wetland Species:		
<i>Ardea alba</i> Great Egret	Inhabits shallows of rivers, larger dams, freshwater wetlands and irrigation areas.	The dam contains foraging habitat for this species. The proposal is unlikely to adversely impact upon this species.
<i>Ardea ibis</i> Cattle Egret	Inhabits stock paddocks, pastures, croplands, wetlands and drains.	The dam and paddock contains foraging habitat for this species. The proposal is unlikely to adversely impact upon this species.
<i>Gallinago hardwickii</i> Latham's Snipe	Utilises a variety of habitat, such as soft wet ground or shallow water with tussock and other green and dead vegetation, and scrub or open wetland from sea-level to alpine bogs (Pizzey & Knight, 2001).	No habitat is present for this species due to the lack of cover. The proposal is unlikely to impact upon this species.
<i>Rostratula australis</i> Australian Painted Snipe	The Australian Painted Snipe is usually found within marshes where there is moderate cover.	No habitat is present on site as there are no marshes.
Migratory Marine Species (overflies a marine area):		
<i>Apus pacificus</i> Fork-tailed Swift	Inhabits the airspace over open country from semi deserts to coasts.	Due to its general habitat requirements it is unlikely that the proposal will adversely impact upon this species.

- nuclear activities;

The proposal does not involve any type of nuclear activity.

- the Commonwealth marine environment;

The proposal does not involve the modification of the Commonwealth marine environment.

8.0 RECOMMENDATIONS

- Prickly Pear and African Olive were recorded on site, however their incidence was relatively low across the site. It is recommended that ongoing weed control targeting Prickly Pear and African Olive be conducted throughout the site to prevent it from becoming further established on site.
- Depending on the positioning of any building envelopes, associated APZs and access a small area of CHSGIF may need to be removed although this may be avoidable given the extent of cleared areas already present on site. To mitigate the loss of this EEC on site it is recommended that cleared land outside development footprints (particularly within the drainage line) be utilised where appropriate to replant with species consistent with CHSGIF so that no net loss of this community is achieved. It is also recommended that plants consistent with CHSGIF be utilised for landscaping on site.
- It is recommended that the removal of hollow-bearing trees be avoided where possible. If any habitat trees require removal it is recommended that a suitably qualified ecologist be on hand to supervise their removal to reduce the impact on any fauna species which may be present. To mitigate the loss of hollows it is also recommended that nest boxes of similar habitat value be installed at a ratio of 2:1 (2 nest boxes installed for each hollow removed) prior to any clearing taking place within the surrounding trees on site. Provided these recommendations are implemented and given the small amount of habitat to be impacted the proposal is unlikely to have an adverse effect on the life cycle of this vegetation community or the habitat it provides.
- Infection by *Phytophthora cinnamomi* is not known to occur within the study area. The proposal may increase the risk of this infection being introduced to the site. During any future construction it is recommended that all machinery and vehicles entering the site be cleaned of contaminants prior to entering the site.

9.0 CONCLUSION

It is proposed that Lot 22 DP582824 and Lot 221 DP823112 Retreat Road, Singleton be rezoned to allow for the site to be subdivided into Rural Residential lots. The 37 ha site slopes down on all sides to an ephemeral drainage line running through the site from the north-western corner to the eastern boundary. It is anticipated that a buffer on either side of the drainage line will be retained and vegetated to enhance visual amenity and ecological connectivity.

Native vegetation within the site primarily consisted of mature and juvenile Eucalypts. Canopy species present across the site included *Corymbia maculata* (Spotted Gum), *Eucalyptus crebra* (Narrow-leaved Ironbark) and *Eucalyptus fibrosa* (Broad-leaved Ironbark). The site has been subject to extensive vegetation clearance and grazing resulting in a largely cleared pasture community over the majority of the site with a high proportion of exotic species.

Approximately 6ha of Dry Sclerophyll Open Forest consistent with Map Unit 27 – Central Hunter Ironbark – Spotted Gum – Grey Box Forest was found to be present on site, concentrated in the east. This community was highly disturbed due to clearing and grazing resulting in a substantially reduced understorey. This community was confirmed to be a disturbed remnant of Central Hunter Spotted Gum – Ironbark Forest in the Sydney Basin Bioregion (CHSGIF), which is listed as an Endangered Ecological Community under the NSW Threatened Species Conservation Act 1995.

Depending on the positioning of future building envelopes within the eastern portion of the site a number of these canopy trees may need to be removed although the majority of proposed building envelopes are expected to be located within the already cleared area presently covering most of the site. To mitigate any loss of this EEC on site it is recommended that appropriate areas of cleared land outside the development footprints such as the drainage line be used where appropriate to replant with species consistent with CHSGIF so that no net loss of this community is achieved. It is also recommended that plants consistent with CHSGIF be utilised for landscaping on site.

As it is the proponent's stated intention to retain and revegetate a buffer around the drainage line through the centre of the site considerable scope for replacement and enhancement of CHSGIF exists within this buffer zone. Given the recommendation to utilise species consistent with CHSGIF in replanting and landscaping within the drainage line buffer and other cleared areas on site the proposal is unlikely to result in a significant loss of this community such that its local occurrence is placed at risk of extinction.

Prickly Pear and African Olive were recorded on site, however their incidence was relatively low across the site. It is recommended that ongoing weed control targeting Prickly Pear and African Olive be conducted throughout the site to prevent it from becoming further established on site.

No threatened fauna or flora species were recorded during the survey. All of the 20 threatened fauna species considered in this report and 3 out of 4 flora species were considered to have potential habitat resources of varying quality available within the site. Although the site contributes to the habitat of these species it is unlikely that any of the flora and fauna considered would be solely dependent upon the limited resources available on site. Whilst the proposal may be viewed as an incremental decline of habitat for these species in the local area the proposal is unlikely to have an adverse effect on any of the considered species such that a local population is placed at risk of extinction.

It is recommended that the removal of hollow-bearing trees be avoided where possible. If any habitat trees require removal it is recommended that a suitably qualified ecologist be on hand to supervise their removal to reduce the impact on any fauna species which may be present. To mitigate the loss of hollows it is also recommended that nest boxes of similar habitat value be installed at a ratio of 2:1 (2 nest boxes installed for each hollow removed) prior to any clearing taking place within the surrounding trees on site. Provided these recommendations are implemented and given the small amount of habitat to be impacted the proposal is unlikely to have an adverse effect on the life cycle of the CHSGIF community or the habitat it provides.

Assessment of the site under SEPP 44 – ‘Koala Habitat Protection’ revealed that the site did not contain ‘Potential Koala Habitat’ and accordingly no further provisions of this policy apply to the site.

Considerations have been made to the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act (1999). It was determined that the proposal should have no significant impact on a matter of National Environmental Significance.

The proposal will result in a small incremental loss of habitat in the local area for CHSGIF and a number of the threatened species assessed. However provided the above recommendations are implemented it is considered that the proposal is unlikely to cause the extinction of any species, population or endangered ecological community in the local area.

10.0 BIBLIOGRAPHY

- Auld, B.A. and Medd, R.W. (1996). *Weeds: An Illustrated Botanical Guide to the Weeds of Australia*. Inkata Press, Sydney.
- Barker, J., Grigg, G.C. and Tyler, M.J. (1995). *A Field Guide to Australian Frogs*. Surrey, Beatty & Sons, New South Wales.
- Bell, S.A.J., Peake, T., Tame, T., Simpson, J., & Curran, T. (in prep). *Regionally significant vegetation of the Hunter Valley and Central Coast, New South Wales - A working Register*. Version 1. Hunter Rare Plants Committee, Hunter Region Botanic Gardens. January 2003.
- Bishop, A. (1996). *Field Guide to the Orchids of New South Wales and Victoria*. University of New South Wales Press: Sydney.
- Briggs, J.D. & Leigh, J. H. (1996) Rare or Threatened Australian Plants. CSIRO Canberra.
- Churchill, S. (2008). *Australian Bats*. (2nd edn.). Allen & Unwin Australia.
- Cogger, H.G. (1992). *Reptiles and Amphibians of Australia* (5th edn.). Reed International, New South Wales.
- Cropper, S. (1993). *Management of Endangered Plants*. CSIRO Publications, East Melbourne.
- Department of Environment and Climate Change (NSW) 2008. *Hygiene protocol for the control of disease in frogs*. Information Circular Number 6. DECC (NSW), Sydney South.
- DECCW (2010), *Flora and Fauna Database 1:100,000 map sheet covered '9133' Camberwell and '9132' Cessnock*, (database received November 2010).
- Harden, G (1991-2000). *Flora of New South Wales. Vols 1-4*. NSW University Press.
- Hill, L. & Peake, T. (2005). *The Vegetation of Belford National Park, New South Wales*. Report for NSW National Parks and Wildlife Service.
- Jones, D. L. (2006). *A Complete Guide to Native Orchids of Australia including the Island Territories*. New Holland Publishers (Australia) Pty Ltd.
- Klaphake, V. (2009). *Eucalypts of the Sydney Region*. Unpublished.
- Land & Property Information (2001), *Topographic & Orthophoto Map 1:25000: Beresfield 9232-3N*, LPI, Bathurst, NSW
- Murray, M., Bell, S., Hoyer, G. (2002). *Flora and Fauna survey Guidelines: Lower Hunter & Central Coast Region*. Lower Hunter & Central Coast Regional Environmental Management Strategy, Callaghan.
- Peake, T.C. (2006), *The Vegetation of the Central Hunter Valley, New South Wales. A report of the findings of the Hunter Remnant Vegetation Project*. Hunter – Central Rivers Catchment Management Authority, Paterson.
- Pellow, B.J., Henwood, M.J., Carolin, R.C. (2009). *Flora of the Sydney Region*. 5th Edition, A Complete Revision. Sydney University Press 2009.
- Robinson, L. (2003). *Field Guide to the Native Plants of Sydney* (3rd edn.). Kangaroo Press Pty. Ltd., New South Wales.

- Slater, P., Slater, P. and Slater, R. (1995). *The Slater Field Guide to Australian Birds*. Lansdowne Publishing, Sydney.
- Strahan, R. (Ed) (1995). *The Mammals of Australia*. Reed Books, Australia.
- Swan, G. (1990). *A Field Guide to the Snakes and Lizards of New South Wales*. Three Sisters Productions, New South Wales.
- Triggs, B. (1984). *Mammal Tracks and Signs-A Field Guide for South-eastern Australia*. Oxford University Press, Melbourne.
- Tyler, M.J. (1992). *Encyclopaedia of Australian Animals-Frogs*. Angus & Robertson, Sydney.
- Wildthing Environmental Consultants (2010). *Seven Part Test on Threatened Flora and Fauna for a proposed 2 Lot Subdivision at Lot 562 DP1118377 Belmadar Way, Maison Dieu NSW*. Prepared for K & N Gray.

APPENDIX A

THREATENED SPECIES DESCRIPTIONS

- **Acacia pendula** **Weeping Myall population in the Hunter catchment**

A disjunct population of fewer than 1000 individual erect or spreading 5-13 m high trees with a pendulous habits that occurs in the Hunter Valley at the eastern distributional limit of the species' range. The species occurs on the western slopes, western plains and far western plains of NSW, and south into Victoria and north into Queensland. Within the Hunter catchment the species typically occurs on heavy soils, sometimes on the margins of small floodplains, but also in more undulating locations. It is not known to occur within any conservation areas.

This Hunter population is known to occur naturally as far east as Warkworth, and extends northwest to Muswellbrook and to the west of Muswellbrook at Wybong. Only recorded to date at 6 locations: Jerrys Plains, Edderton, Wybong, Appletree Creek, Warkworth and Appletree Flat. These locations occur within the Muswellbrook and Singleton Local Government Areas, with the population potentially also occurring within the Mid-Western Regional and Upper Hunter LGA's.

The stand at Jerrys Plains is part of the community known as "Weeping Myall - Coobah - Scrub Wilga Shrubland of the Hunter Valley". This is listed under Commonwealth legislation as a "Critically Endangered Ecological Community".

Bibliography:

NSW Scientific Committee (2005) *Acacia pendula* (a tree) in the Hunter catchment - endangered population listing. Final determination DEC (NSW), Sydney.

- ***Eucalyptus camaldulensis*** **River Red Gum (Endangered Population)**

The population of River Red Gum in the Hunter is unique in NSW being the only one to occur in a coastal catchment. It is disjunct and at the limit of range of the species, it may be genetically distinct, and is of conservation significance as the community dominant in distinct riparian and floodplain vegetation types.

The Hunter population occurs from the west at Bylong, south of Merriwa, to the east at Hinton, on the bank of the Hunter River, in the Port Stephens LGA. Prior to European settlement, between 10,000 and 20,000 ha of habitat suitable for the River Red Gum occurred in the Hunter catchment. Today only 19 stands are known, occupying at most c. 100 ha, the largest remnant being 15 - 20 ha in extent. Smaller remnants contain only one to several trees. The total number of individuals is estimated to be between 600 - 1000 mature or semi mature trees. May occur with *Eucalyptus tereticornis*, *Eucalyptus melliodora*, *Casuarina cunninghamiana* subsp. *cunninghamiana* and *Angophora floribunda*.

Bibliography:

Brooker, M.I.H. and Kleining, D.A. (1999). Field Guide to Eucalypts of South-eastern Australia. Inkata Press, Sydney.

Harden, G. (ed) (1991). Flora of NSW - Vol 2. New South Wales Uni Press, Sydney.

NSW Scientific Committee (2005), *Eucalyptus camaldulensis* (a tree) Hunter catchment population - Endangered Population determination - Final. DEC (NSW), Sydney

- ***Eucalyptus glaucina*** **Slaty Red Gum**

Eucalyptus glaucina occurs as a tree, often to 18m, sometimes to 30m. The bark is smooth throughout, white or grey. Juvenile leaves are ovate, pale green or glaucous and slightly discoloured.

Adult leaves are lanceolate to broadly lanceolate, acuminate and moderately thick. Fruits are hemispherical or ovoid, 7-10mm long, 7-10mm wide; disc broad, ascending; valves 3-5. The seeds are brown-black.

The Slaty Red Gum principally occurs in the Casino area in northern NSW and from Gloucester to Broke, in mid-northern NSW. It grows mostly on gentle slopes near drainage lines in alluvial and clayey soils, in open forest. It is closely aligned with *E. tereticornis* (Forest Red Gum), but distinguished by the glaucous buds. This species is ROTAP-coded 3VCa.

Bibliography:

- Briggs, J.D. and Leigh, J.H. (1995). Rare or Threatened Australian Plants. CSIRO Publishing, Victoria.
- Brooker, M.I.H. and Kleining, D.A. (1999). Field Guide to Eucalypts of South-eastern Australia. Inkata Press, Sydney.
- Carolin, R.C. and Tindale, M.D. (1993). Flora of the Sydney Region (4th edn.). Reed, Sydney.
- George, A. (exec. ed.) (1988). Flora of Australia, Volume 19: Myrtaceae - Eucalyptus and Angophora. Australian Government Publishing Service, Canberra.
- Harden, G. (ed) (1991). Flora of NSW - Vol 2. New South Wales Uni Press, Sydney.
- State Forests of NSW (1994). Flora Survey, Morisset Forestry District, Central Region, NSW. Forest Resources series No. 35.

- ***Thesium australe***

Austral Toadflax

Thesium australe, a member of the Santalaceae family, occurs as a perennial pale-green or yellow-green herb. This species occurs from south-eastern Queensland to East Gippsland, Victoria, with isolated populations occurring in Tasmania. It occurs in grassland and woodlands, often in damp areas. It has one to several little branched wiry stems to 40cm tall, with 1-3cm acute linear leaves of which the lowest are scale-like. This species flowers in spring-summer, the flowers are solitary axillary and united with the leaf-base. The fruits are globose, crowded with persistent sepals and are produced in summer. This species is ROTAP-coded 3VCi+, indicating that it has a natural distribution outside of Australia.

Bibliography:

- Briggs, J.D. and Leigh, J.H. (1995). Rare or Threatened Australian Plants. CSIRO Publishing, Victoria.
- Carolin, R.C. and Tindale, M.D. (1993). Flora of the Sydney Region (4th edn.). Reed, Sydney.
- George, A. (exec. ed) (1984). Flora of Australia. Vol. 22: Rhizophorales to Celastrales. Australian Government Publishing Service, Canberra.
- Harden, G. (ed) (1992). Flora of NSW - Vol 3. New South Wales Uni Press, Sydney.

- ***Ephippiorhynchus asiaticus***

Black-necked Stork

The Black-necked Stork, formerly known as the Jabiru, ranges through India, south-eastern Asia, southern New Guinea and into northern and eastern Australia. It was known in the Sydney district when

settlement was established, disappeared by the 1850s and began to recolonise from about 1930. There is nothing to suggest that the Black-necked Stork in Australia makes seasonal movements, though it is capable of moving long distances and turning up far from breeding grounds. The Black-necked Stork is often in pairs and occasionally in parties of up to 18. Sexes are alike, apart from the eye, which is yellow in the female and black in the male.

It usually inhabits swamps associated with river systems and large permanent pools but sometimes appears on the coast or in estuaries. It has also been recorded on farm dams and sewage treatment ponds. There are no studies of banded birds but it may be that an individual, having once settled in a locality, remains for many years. The species fly high and straight with slow, deliberate wingbeats and the birds are generally seen stalking quietly about seeking its prey, every now and again taking great strides and jabbing at fish with its bill. The bird feeds on fish, frogs, crabs, carrion and possibly rats. Nests are usually found in low trees in swamps or in tall forest trees but may be occasionally on the ground.

Bibliography:

Garnett, S.T. and Crowley, G.M. (2000). The Action Plan for Australian Birds 2000. Report to Environment Australia and Birds Australia, October 2000.

Hunter Bird Observers Club (1999). Hunter Region of New South Wales: Annual Bird Report Number 6 (1998), HBOC Inc., August 1999.

Marchant, S. and Higgins, P.J. (1990). Handbook of Australian, New Zealand & Antarctic Birds: Volume 1B Australian Pelican to Ducks, Oxford University Press, Melbourne.

NSW National Parks and Wildlife Service, (1997). Threatened Species Conservation Act 1995 NSW Scientific Committee Final Determination, Black-necked Stork, *Ephippiorhynchus asiaticus*.

NPWS Database (2000). Fauna Species Lists for Protected Areas in NSW at 'http://www.nationalparks.nsw.gov.au'

NPWS. (2003). Atlas of NSW Wildlife, at 'www.nationalparks.nsw.gov.au'.

Pizzey, G. & Knight, F. (1997). Field Guide to the Birds of Australia, Angus and Robertson, Sydney.

Reader's Digest (1982). The Complete Book of Australian Birds, Reader's Digest Services Pty. Ltd., Sydney.

• *Erythrotriorchis radiatus*

Red Goshawk

The Red Goshawk is thought to occupy Open Forest and Woodland, especially those located near wetlands, rivers and rainforest fringes. Its habits are not well known but are considered to be a solitary, sedentary bird. The Red Goshawk nests in tree forks of *Eucalypts* and *Melaleucas* or those nests of other large birds such as Magpies or Crows. The nests are generally built of sticks that are lined with soft twigs and leaves. Breeding occurs during late winter/early spring and produces around two young. One of the features of the Red Goshawk is the massive, powerful yellow legs and talons. This species primarily feeds on small animals and nestlings of other birds, however it is known to have consumed animals as large as the Pacific Black Duck. It tends to be limited to coastal and sub-coastal north and north-east Australia, ranging from the Kimberleys in W.A. to the N.S.W./QLD border in the south.

Bibliography:

Garnett, S.T. and Crowley, G.M. (2000). The Action Plan for Australian Birds 2000. Report to Environment Australia and Birds Australia, October 2000.

Marchant, S. and Higgins, P.J. (1993). Handbook of Australian, New Zealand & Antarctic Birds: Volume 2 Raptors to Lapwings, Oxford University Press, Melbourne.

NPWS (1999). Threatened Species Information – Red Goshawk, at ‘www.nationalparks.nsw.gov.au’

NPWS. (2003). Atlas of NSW Wildlife, at ‘www.nationalparks.nsw.gov.au’.

Pizzey, G. & Knight, F. (1997). Field Guide to the Birds of Australia, Angus and Robertson, Sydney.

Reader’s Digest (1982). The Complete Book of Australian Birds, Reader’s Digest Services Pty. Ltd., Sydney.

- ***Callocephalon fimbriatum***

Gang-gang Cockatoo

The Gang-gang Cockatoo is distributed from southern Victoria through south and central-eastern New South Wales. In New South Wales, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and southwest slopes. It is rare at its extremities of its range, with isolated records known from as far west as Mudgee.

In summer they are generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter they move to lower altitudes and drier more open eucalypt forests and woodlands, and often found in urban areas. In winter they show a preference for 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. Breeding usually occurs between October and January in tall mature sclerophyll forests that have a dense understorey, and occasionally in coastal forests. Nests are most commonly recorded in eucalypt hollows in live trees close to water.

Bibliography:

Forshaw, J. M. (1991). *Australian Parrots* (2nd Ed.). Ure Smith Press, Willoughby, NSW.

Garnett, S.T. and Crowley, G.M. (2000). *The Action Plan for Australian Birds 2000*. Report to Environment Australia and Birds Australia, October 2000.

Pizzey, G. & Knight, F. (1997). *Field Guide to the Birds of Australia*, Angus and Robertson, Sydney.

NPWS Database (2000). *Fauna Species Lists for Protected Areas in NSW* at <http://www.npws.nsw.gov.au/wildlife/species.htm>

Reader’s Digest (1982). *The Complete Book of Australian Birds*. Reader’s Digest Services Pty. Ltd., Sydney.

Slater, P., Slater, P. & Slater, R. (1995). *The Slater Field Guide to Australian Birds*. Lansdowne Publishing Pty. Ltd., Sydney.

- ***Glossopsitta pusilla***

Little Lorikeet

The Little Lorikeet measures 16–19 cm in length and is the smallest of the Australian Lorikeets. The body is bright green in colour and the head is green with red forehead and throat patches that do not extend behind the eye. These features, in combination with the black beak and green underwing coverts which are visible in flight, allow the species to be distinguished from other small lorikeets.

The Little Lorikeet occurs from just north of Cairns, around the east coast of Australia, to Adelaide. In New South Wales Little Lorikeets are distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri (Barrett *et al.* 2003). Little Lorikeets are gregarious, usually foraging in small flocks, often with other species of lorikeet. They feed primarily on nectar and pollen in the tree

canopy, particularly on profusely-flowering eucalypts, but also on a variety of other species including, melaleucas and mistletoes.

Bibliography:

Barrett G, Silcocks A, Barry S, Cunningham R, Poulte, R (2003) 'The New Atlas of Australian Birds'. Birds Australia, Melbourne.

Forshaw, Joseph M. (1991). *Australian Parrots* (2nd edn.). Ure Smith Press, Willoughby, NSW.

NSW Scientific Committee (2007) *Little Lorikeet analysis November 2007*.

Pizzey, G. & Knight, F. (1997). *Field Guide to the Birds of Australia*, Angus and Robertson, Sydney.

Reader's Digest (1982). *The Complete Book of Australian Birds*. Reader's Digest Services Pty. Ltd., Sydney.

- *Lathamus discolor*

Swift Parrot

The Swift Parrot is most closely related to Rosellas, though its habits are most closely aligned with those of the Lorikeets, which it also resembles morphologically. The main distinction of the Swift Parrot is the long red tail that is not found in Lorikeets, which generally have dumpier green tails. During winter the Swift Parrot inhabits mainland Australia from Adelaide (S.A.) through Victoria, and up the east coast to south-east Queensland, as well as visiting the south and central western slopes and the Riverina in N.S.W. The Swift Parrot returns to eastern Tasmania in spring to breed.

The species appears to have declined greatly in the northern and eastern parts of its overwintering range, to the extent that the NSW Scientific Committee has upgraded the listing of the Swift Parrot from Schedule 2 (Vulnerable) to Schedule 1 (Endangered) (NSW Scientific Committee, 2000). The Swift Parrot is also listed under the Commonwealth Environment Protection and Biodiversity Act (1999) as 'Endangered'. Recent investigations have indicated that there may only be 1000 breeding pairs throughout its entire range (Garnett and Crowley, 2000; Brereton, 1998; Forshaw, 1993). The continued loss of foraging resources, in particular winter-flowering Eucalypt species, appears to be most serious short term threat to this species in NSW. The most recent records are from the tablelands and western slopes of southern and central NSW. Swift Parrots have also been recorded during the winter months of 2000 utilising areas in the vicinity of Aberdare State Forest (Roderick, pers. comm.) and Millers Forest (Newman, pers. comm.).

The Swift Parrot prefers Dry Sclerophyll Forest in Tasmania and Open Forest to Woodland in the north on the mainland. It has also been recorded utilising street trees and in parks and gardens. Swift Parrots forage on the nectar of Eucalypts, often in mixed flocks with Lorikeets. The preferred winter food species are *Eucalyptus sideroxylon* (Red Ironbark), *E. albens* (White Box), *E. ovata* (Swamp Gum), *E. robusta* (Swamp Mahogany) and *E. melliodora* (Yellow Gum) and have also been observed eating the seeds and flowers of *Xanthorrhoea* spp. (Grass Trees). They also feed on insects and their larvae, fruits, berries, seeds and vegetable matter. While feeding, individuals may be approached and watched from under the feed tree. When there is an abundance of food, large congregations of hundreds of birds may gather in noisy and crowded roosts. Nesting occurs from September to January in a hollow branch of Eucalypts and they return to the mainland during March and April.

Bibliography:

Brereton, R. (1998). A Review of the Conservation Status of the Swift Parrot (*Lathamus discolor*). Submission to the Endangered Species Scientific Subcommittee, Environment Australia.

Garnett, S.T. and Crowley, G.M. (2000). The Action Plan for Australian Birds 2000. Report to Environment Australia and Birds Australia, October 2000.

- Brouwer, J. & Garnett, S. (Eds.) (1990). Threatened Birds of Australia: An annotated list. Royal Australasian Ornithologists union (RAOU) Report Number 68.
- Forshaw, J. M. (1993). Swift Parrot (*Lathamus discolor*) In: Readers Digest Complete Book of Australian Birds (2nd edn.). Schodde, R. and Tidemann, S. (eds). Readers Digest, Sydney.
- Forshaw, J. M. (1991). Australian Parrots (2nd Ed.). Ure Smith Press, Willoughby, NSW.
- NSW Scientific Committee (2000). Final Determination to list *Lathamus discolor* (Swift Parrot) as an Endangered Species at '<http://www.nationalparks.nsw.gov.au>'.
- NPWS. (2003). Atlas of NSW Wildlife, at 'www.nationalparks.nsw.gov.au'.
- Pizzey, G. & Knight, F. (1997). Field Guide to the Birds of Australia, Angus and Robertson, Sydney.
- Reader's Digest (1982). The Complete Book of Australian Birds, Reader's Digest Services Pty. Ltd., Sydney.
- Slater, P., Slater, P. & Slater, R. (1995). The Slater Field Guide to Australian Birds, Lansdowne Publishing Pty. Ltd., Sydney.

- *Climacteris picumnus ssp. victoriae*

Brown Treecreeper

The Brown Treecreeper, *Climacteris picumnus* is distributed along the east coast of Australia from Spencer Gulf in South Australia, north to Townsville in Queensland and west to Channel Country. The eastern subspecies, *Climacteris picumnus victoriae*, is distributed through central NSW on the western side of the Great Dividing range and sparsely scattered to the east of the divide in drier areas such as the Cumberland Plain of Western Sydney, and in parts of the Hunter, Clarence, Richmond and Snowy River Valleys.

This species is a medium sized insectivorous bird that occupies Eucalypt woodlands, particularly open woodlands lacking a dense understorey, River Red Gums on watercourses and around lake shores. It is sedentary and nests in tree hollows within permanent territories. They forage on tree trunks and on the ground amongst leaf litter and on fallen logs for ants, beetles and larvae. Breeding occurs from May to December.

Bibliography

- NSW National Parks and Wildlife Service, (2001). Threatened Species Conservation Act 1995 NSW Scientific Committee Final Determination, Brown Treecreeper (eastern subspecies) *Climacteris picumnus victoriae*.
- NPWS. (2003). Atlas of NSW Wildlife, at 'www.nationalparks.nsw.gov.au'.
- Pizzey, G., & Knight, F., (1997). Field Guide to the Birds of Australia, Angus and Robertson, Sydney.
- Slater, P., Slater, P., & Slater, R., (1997). The Slater Field Guide to Australian Birds, Lansdowne Publishing, Sydney.

- *Pomatostomus temporalis ssp. temporalis*

Grey-crowned Babbler

The Grey-crowned Babbler occurs in N.S.W. on the western slopes and plains, with isolated populations in coastal woodlands on the North Coast, Hunter Valley and South Coast near Nowra. The Grey-crowned Babbler ranges through open forest, woodland, scrubland, farmland and outer suburbs. Prefers woodlands with regenerating trees, tall shrubs, and an intact ground cover of grass and forbs. Members of this species are rare in settled areas and are threatened by vegetation clearance, habitat fragmentation and degradation, and competition from introduced species. Builds dome-shaped nests with a spout-like entrance, lined with grass, bark-fibre, rootlets, feathers, and wool. The Grey-crowned Babbler breeds between June and October in sedentary family units of 2-13 birds. The species produces 2-6 buff, purple-brown or dark grey eggs with dark brown scribbles. The species is insectivorous and forage in leaf litter and on the bark of trees.

Bibliography:

NSW National Parks and Wildlife Service. (2001). Threatened Species Conservation Act 1995 NSW Scientific Committee Final Determination, Grey-crowned Babbler (eastern subspecies) *Pomatostomus temporalis temporalis*.

NPWS. (2003). Atlas of NSW Wildlife, at 'www.nationalparks.nsw.gov.au'.

Pizzey, G., & Knight, F. (1997). Field Guide to the Birds of Australia, Angus and Robertson, Sydney.

Slater, P., Slater, P., & Slater, R., (1997). The Slater Field Guide to Australian Birds, Lansdowne Publishing, Sydney.

- *Pyrrholaemus sagittatus*

Speckled Warbler

The Speckled Warbler is a small bird, which occurs, in south-eastern Australia, from south-western Victoria through eastern New South Wales to Central Queensland, mostly on the western slopes and tablelands of the Great Dividing Range and on the driest sections of coast. Speckled Warblers live in a wide range of eucalypt-dominated vegetation that has a grassy understorey, often on rocky ridges or in gullies.

Speckled Warblers feed on seed and insects. It builds a domed nest of grass, bark shreds and moss, lined with fur on the ground. They lay 3 to 4 eggs and the breeding season occurs from August to January. Speckled Warblers have declined over most of their range. Much of the habitat has been cleared with smaller fragments gradually losing remnant sub-populations, sometimes more than 30 years after they have been isolated. Because it occurs at low densities, small patches may contain sub-populations that are vulnerable to local extinction as a result of normal fluctuations, and are unlikely to be recolonised because dispersal abilities across open land appear to be poor. Birds that occur in fragments are particularly vulnerable to nest predation. Grazing by stock, kangaroos and rabbits can remove the moderately dense groundcover the birds require.

Bibliography:

Garnett, S.T. and Gabriel, M.C. (2000). The Action Plan for Australian Birds. National Heritage Trust.

NPWS. (2003). Atlas of NSW Wildlife, at 'www.nationalparks.nsw.gov.au'.

Pizzey, G. & Knight, F. (1997). Field Guide to the Birds of Australia, Angus and Robertson, Sydney

Slater, P., Slater, P. and Slater, R. (1997). The Slater Field Guide to Australian Birds. Lansdowne Publishing, Sydney.

- *Petroica boodang*

Scarlet Robin

The Scarlet Robin is found in south-eastern Australia (extreme south-east Queensland to Tasmania, western Victoria and south-east South Australia) and south-west Western Australia. In NSW it occupies open forests and woodlands from the coast to the inland slopes (Higgins and Peter 2002). The Scarlet Robin breeds in drier eucalypt forests and temperate woodlands, often on ridges and slopes, within an open understorey of shrubs and grasses and sometimes in open areas. Abundant logs and coarse woody debris are important structural components of its habitat. In autumn and winter it migrates to more open habitats such as grassy open woodland or paddocks with scattered trees. It forages from low perches, feeding on invertebrates taken from the ground, tree trunks, logs and other coarse woody debris. The Scarlet Robin builds an open cup nest of plant fibres and cobwebs, sited in the fork of tree (often a dead branch in a live tree, or in a dead tree or shrub) which is usually more than 2 m above the ground.

Bibliography:

DECCW, (2010). Threatened Species Conservation Act 1995 NSW Scientific Committee Final Determination, *Scarlet Robin Petroica boodang-vulnerable species listing*.

Pizzey, G. & Knight, F. (1997). Field Guide to the Birds of Australia, Angus and Robertson, Sydney

- *Petroica phoenicea*

Flame Robin

The Flame Robin is a small Australian robin that reaches 14 cm in length. It ranges from near the Queensland border to SE South Australia and also in Tasmania. In NSW, it breeds in upland areas and in winter, many birds move to the inland slopes and plains. It is likely that there are two separate populations in NSW, one in the Northern Tablelands, and another ranging from the Central to Southern Tablelands.

The Flame Robin breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. It prefers clearings or areas with open understoreys. The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgeland at high altitudes. Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following regeneration.

In winter the Flame Robin lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees. It is occasionally seen in heathland or other shrublands in coastal areas. It forages on small invertebrates taken from the ground or woody debris, flying insects taken in the air and invertebrates gleaned from foliage and bark.

The Flame Robin occurs singly, in pairs, or in flocks of up to 40 birds or more; in the non-breeding season they will join up with other insectivorous birds in mixed feeding flocks. It breeds in spring to late summer, building an open cup nest made of plant materials and spider webs often near the ground in sheltered sites such as shallow cavities in trees, stumps or banks. Clutch size is three or four eggs.

Bibliography:

DECCW, (2010). Threatened Species Conservation Act 1995 NSW Scientific Committee Final Determination, *Flame Robin Petroica phoenicea-vulnerable species listing*.

Pizzey, G. & Knight, F. (1997). Field Guide to the Birds of Australia, Angus and Robertson, Sydney

- *Dasyurus maculatus*

Tiger QuollConservation Status:

NSW (TSC Act 1995) – Vulnerable
National (EPBC Act 1999) – Endangered

Distribution:

The Tiger Quoll is widespread in eastern Australia, with its distribution being spread between two subspecies. The nominate subspecies, *D. m. maculatus* occurs from southern QLD to Tasmania whereas *D. m. gracilis* occurs in northern QLD.

Ecology and Habitat Requirements:

This species is one of the largest carnivorous marsupials. It is an agile climber but spends most of its time on the floor of sclerophyll forests, rainforests and coastal woodlands. Although largely nocturnal, it may forage and bask in the sun during the day. Nests are made in rock caves and hollow logs or trees, and basking sites are usually found nearby. It is an opportunistic hunter of a variety of prey, including birds and their young, rats and other small terrestrial and arboreal mammals, gliders, small Macropods, reptiles and Arthropods. It also scavenges on the carcasses of domestic stock. Sexual maturity is attained in one year, with mating occurring from April to July. Usually, there are 5 young to a litter and young are fully independent at 18 weeks.

Bibliography:

Edgar, R. and Belcher, C. (1995). Spotted-tailed Quoll (*Dasyurus maculatus*) in Strahan, R. (ed) *The Mammals of Australia*, pp: 67-68. Strahan, R. (Ed). Reed Books, Australia.

Menkhorst, P. and Knight, F. (2001) *A Field Guide to the Mammals of Australia*. Oxford Uni Press, Melbourne.

NPWS Database (2000). *Fauna Species List for Protected Areas in NSW* at <http://www.npws.gov.au/wildlife/species.htm>

• *Phascogale tapoatafa*

Brush-tailed Phascogale

Conservation Status:

NSW (TSC Act 1995) – Vulnerable
National (EPBC Act 1999) – Not Listed

Distribution:

There are two subspecies of the Brush-tailed Phascogale, the nominate race, *P. t. tapoatafa*, which occurs in south-east NSW, Victoria and south-east SA and *P. t. pirata*, which occurs in northern Australia.

Ecology and Habitat Requirements:

A nocturnal species, the Brush-tailed Phascogale is mainly arboreal but also forages on the ground, eating insects and occasionally small vertebrates. The Brush-tailed Phascogale is known from a variety of forest types from Rainforest to Woodland, but is most frequently recorded in the drier Sclerophyll Forests with little ground cover, on ridges up to 600m altitude. There are two subspecies of the Brush-tailed Phascogale, the nominate race, *P. t. tapoatafa*, which occurs in south-east NSW, Victoria and south-east SA and *P. t. pirata*, which occurs in northern Australia.

It requires small tree hollows and suitable foraging sites in the canopy, sub-canopy, and ground layer of vegetation. During the day it sleeps in a nest lined with leaves or shredded bark in a tree hollow, emerging at dusk to feed. Animals may return to the nest occasionally through the night and, when several share a nest, they tend to show a similar pattern of nocturnal activity. In Victoria, home ranges were recorded from between 20-70ha for females, and there is often no overlap in this home range with other unrelated females of the species. Males may occupy an area of greater than 100ha and contrary to females, overlap with the home ranges of other males and females. The NSW experience is that the

Brush-tailed Phascogale may have much smaller home ranges where conditions are suitable. Females may only occupy a home range of 4-5ha when carrying young. It is sexually mature at 11 months, with mating in June. The female has 8 teats and young are weaned at around 5 months of age. Males die soon after mating while females may breed over two consecutive years.

Bibliography:

Cronin, L. (1991). Key Guide to Australian Mammals. Reed Books, Australia.

Humphries, R. and Seebeck, J. (1997). Brush-tailed Phascogale *Phascogale tapoatafa*. Victorian Department of Natural Resources and Environment Action Statement No. 79, at <http://www.dcc.vic.gov.au/plntanml/native/actstats/content/as79.htm>

NPWS. (2003). Atlas of NSW Wildlife, at <http://www.nationalparks.nsw.gov.au>

Rhind, S. (1996). Out on a limb. Australian Geographic, 43: 92-99.

Soderquist, T. (1995). Brush-tailed Phascogale (*Phascogale tapoatafa*). In: The Mammals of Australia, pp: 104-106. Strahan, R. (Ed). Reed Books, Australia.

Soderquist, T.R. (1995). Spatial organisation of the arboreal carnivorous marsupial *Phascogale tapoatafa*. Journal of Zoology (London), 237: 385-398.

Soderquist, T.R. and Ealey, L. (1994). Social Interactions and Mating Strategies of a Solitary Carnivorous Marsupial, *Phascogale tapoatafa*, in the Wild. Wildlife Research, 21: 527-542.

Truill, B.J. and Coates, T.D. (1993). Field observations of the Brush-tailed Phascogale, *Phascogale tapoatafa* (Marsupialia:Dasyuridae). Australian Mammalogy, 16: 61-65.

Triggs, B. (1996). Tracks, Scats and Other Traces: a Field Guide to Australian Mammals. Oxford University Press, Australia.

• *Phascolarctos cinereus*

Koala

Conservation Status:

NSW (TSC Act 1995) – Vulnerable

National (EPBC Act 1999) – Not Listed

Distribution:

The Koala occurs along the east coast of Australia and extends into woodland, mulga and River Red Gum forests west of the Great Dividing Range. Its range covers all such suitable areas of N.S.W. In drier forested areas, Koalas are generally observed as individuals in low densities. They are more abundant in coastal woodland and in open forest, where they have been found in densities as high as ten per hectare. They are rare or absent in wet forests in the south above 600 m which may be due more to distribution of Eucalypt species than climate, as the Koala is limited to areas where there are acceptable food trees.

Ecology and Habitat Requirements:

Its diet is generally restricted to that of Eucalypt leaves and much less-often, non-Eucalypt foliage. The foliage of *Eucalyptus camaldulensis* (River Red Gum), *E. tereticornis* (Forest Red Gum), *E. punctata* (Grey Gum), *E. viminalis* (Manna Gum), and *E. robusta* (Swamp Mahogany) are some of the preferred Eucalypt species. Koalas use a wide variety of tree sizes, and do not preferentially use large or tall trees in NSW forests, although this has been listed as a habitat preference in areas where trees are generally small, stunted, or nutrient deprived.

Koalas sleep in the fork of a tree during the day and feed at night with the peak of activity just after sunset. It is generally a solitary animal with a social behaviour pattern that influences its breeding biology. Breeding biology of the Koala is characterised by the occurrence of discrete core breeding groups which are sedentary. A core group may comprise up to several dozen individuals that are usually well separated from other breeding groups. These core groups produce a continual supply of dispersing nomadic sub-adults. Individual Koalas within core breeding groups occupy semi-exclusive territories. There is interaction with and marginal overlap of territories between adjacent individual animals. The territories of breeding males generally occur within a matrix of adjacent territories of breeding females. In the overlap zones of adjacent territories of breeding Koalas, individual trees occur that are habitually used for interaction between the two animals concerned. These breeding core interaction trees (sometimes termed "home range trees") are readily identifiable by scratched "trails" up the bole and copious dung deposits at the base of the tree. Breeding occurs in summer and young females produce one young (rarely twins) each year.

Bibliography:

Australian Koala Foundation (1996). The Koala Habitat Atlas - Project No 6: Port Stephens Local Government LGA. Draft Report prepared for Port Stephen Council.

Menkhorst, P. and Knight, F. (2001) A Field Guide to the Mammals of Australia. Oxford Uni Press, Melbourne.

NPWS. (2003). Atlas of NSW Wildlife, at <http://www.nationalparks.nsw.gov.au>

Port Stephens Council (2000). *Port Stephens Council Comprehensive Koala Plan of Management (CKPoM). Draft for Public Exhibition - September 2000.* Prepared by Port Stephens Council with the Australian Koala Foundation.

Reed, P.C., Lunney, D. and Walker, P. (1990). A 1986-1987 Survey of the Koala *Phascolarctos cinereus* (Goldfuss) in New South Wales and an Ecological Interpretation of its Distribution. In: Lee, A.K., Handasyde, K.A. and Sanson, G.D. (Eds). *Biology of the Koala*, Surrey Beatty and Sons Pty Ltd.

Triggs, B. (1996). *Tracks, Scats and Other Traces: a Field Guide to Australian Mammals.* Oxford University Press, Australia.

- ***Pteropus poliocephalus***

Grey-headed Flying-foxConservation Status:

NSW (TSC Act 1995) – Vulnerable.

National (EPBC Act 1999) – Vulnerable

Description:

The Grey-headed Flying-fox is a large species of megachiropteran bat which possess a mantle of rusty brown fur that full encircles the neck. The fur on the back is dark grey and as the common name suggests, the head is covered with light grey fur. The grey belly fur is often flecked with white and ginger. The fur extends down the legs to the toes, which contrasts with other *Pteropus* species, which are furred only to the knees. This species weighs up to a kilogram and has a forearm length of up to 180mm.

Distribution:

The Grey-headed Flying-fox is distributed predominantly along the sub-tropical east coast, from Rockhampton (Qld) through NSW to SE Victoria.

Ecology and Habitat Requirements:

Grey-headed Flying-foxes are known to occupy a variety of habitats, including wet and dry sclerophyll forests, rainforest, mangroves and paperbark swamps and *Banksia* woodlands. Here they forage on a range of fruits and blossoms. Their diet is so varied that they have been recorded eating the fruit or blossom of more than 80 species of plant. The predominant food source is Eucalypt blossom and fruits from trees such as *Ficus* spp. (Figs). It is likely to act as an important pollinator for many of the trees on which they utilise blossoms. They also inhabit cultivated areas where they feed on introduced trees including commercial food crops, and can become a 'pest' animal in these areas. Ironically, this has led to this species being the most intensively researched bat in Australia.

As with most species of Flying-fox, *P. poliocephalus* roost communally where they form large communal colonies called 'camps'. Camps are mostly in rainforest patches, mangroves, paperbark forests and modified vegetation in urban areas. These camps may contain thousands of individuals, and up to 200 000 individuals have been recorded at one camp. They may move up to 70km from the camp each night to forage. Young are raised in maternity camps after birthing in September to October. The young are able to fly at 3 months of age and puberty is reached at 18 months, although males do not achieve effective fertility until 30 months. Vocal communication is highly sophisticated, with over 20 different situation-specific calls being recorded.

Recently, it has been identified as being a potential carrier of viral pathogens, such as Lyssa-virus.

Bibliography:

- Augee, M.L. and Ford, D. (1999). Radio-tracking studies of Grey-headed Flying-foxes *Pteropus poliocephalus*, from the Gordon colony, Sydney. Proceedings of the Linnaean Society of NSW, Vol. 121, pp 61-70.
- Catterall, C.P., Storey, R.J. and Kingston, M.B. (1997). Reality versus rhetoric: a case study monitoring regional deforestation. In: Hale, P. and Lamb, D. (Eds). Conservation Outside Nature Reserves, pp 367-377. Centre for Conservation Biology, University of Queensland, Brisbane.
- Churchill, S. (1998). Australian Bats. Reed New Holland Publishers, Sydney, Australia.
- Eby, P. (2000). The results of four synchronous assessments of relative distribution and abundance of Grey-headed Flying-fox *Pteropus poliocephalus*. In: Richards, G. and Hall, L. (Eds). Proceedings of a Workshop to Assess the Status of the Grey-headed Flying-fox, Australasian Bat Society, Canberra.
- Hall, L.S. and Richards, G. (2000). Flying Foxes: Fruit and Blossom Bats of Australia, UNSW Press, Sydney.
- NPWS. (2003). Atlas of NSW Wildlife, at <http://www.nationalparks.nsw.gov.au>
- Tidemann, C.R. (1995). Grey-headed Flying-fox (*Pteropus poliocephalus*) In: Strahan, R. (Ed) (1995). The Mammals of Australia, pp 439-441 Australian Museum / Reed Books.
- Webb, N. and Tidemann, C.R. (1995). Hybridisation between Black (*Pteropus alecto*) and Grey-headed (*P. poliocephalus*) Flying-foxes. In: Australian Mammalogy, Vol 18, pp 19-26.

- ***Falsistrellus tasmaniensis***

Eastern Falsistrelle

Conservation Status:

NSW (TSC Act 1995) – Vulnerable.

National (EPBC Act 1999) – Not Listed

Distribution:

The Eastern Falsistrelle occurs along the coastal ranges from southern Queensland to western Victoria and Tasmania, and is generally found between the Great Divide and the east coast.

Ecology and Habitat Requirements:

These bats inhabit sclerophyll forests from the Great Divide to the east coast. In Tasmania they are found in wet sclerophyll and coastal mallee. A preference has been noted for wet habitats where trees are more than 20m high. Based upon the size and shape of its wings the bat is thought to be highly mobile with a relatively large hunting range. A specimen of this species has been radio-tracked and found to move 12km from where it was hunting to where it was roosting in a very large tree.

On the mainland they eat moths, rove beetles, chafers, weevils, plant bugs, flies and ants. Their flight is swift and direct, within or just below the tree canopy. They tend to fly fast in a fixed horizontal plane with sudden darting changes in course. It has been observed roosting in holes and hollow trunks of Eucalypts, with recorded colony sizes ranging from 3 to 36 individuals. Colonies are usually almost entirely male or female groups, although evenly mixed colonies sometimes occur. They have been recorded roosting in a cave at Jenolan, NSW, and they are occasionally found in old wooden buildings.

Males produce sperm in late summer and store it in the epididymis over the winter. Females produce a large 'hibernation follicle' in autumn. Ovulation, fertilisation and pregnancy occur in late spring and early summer. Single young is born in December. Lactation continues through January and February. The Eastern Falsistrelle hibernates generally during winter, particularly in the southern extent of its range.

Bibliography:

Churchill, S. (1998). Australian Bats. Reed New Holland Publishers, Sydney, Australia.

NPWS. (2003). Atlas of NSW Wildlife, at 'www.nationalparks.nsw.gov.au'.

Phillips, W. (1995). Eastern False Pipistrelle (*Falsistrellus tasmaniensis*). In: The Mammals of Australia, pp: 520-521. Strahan, R. (Ed). Reed Books, Australia.

- ***Miniopterus schreibersii oceanensis***

Eastern Bentwing-bat**Conservation Status:**

NSW (TSC Act 1995) – Vulnerable.

National (EPBC Act 1999) – Not Listed

Distribution:

The Eastern Bentwing-bat it is found across the coastal and near coastal areas of the north of the Northern Territory and Western Australia and also down the east coast from Cape York to Adelaide on the coastal plains and adjacent ranges.

Ecology and Habitat Requirements:

It is a cave (and similar man-made structures) roosting species that generally feeds above the forest canopy in wet and dry tall open forest, catching insects on the wing. However, the species has also been recorded utilising rainforest, monsoon forest, open woodland, paperbark forests and open grasslands. Moths are the main prey item. Flight is very fast and typically relatively level with swift shallow dives; the estimated flight speed is 50km per hour.

The species is known to migrate over large distances, apparently utilising different roosts for different seasonal needs. The pattern of movement varies with local climate and the dispersion of suitable roost sites. It hibernates over winter in the southern parts of its range and development of the embryo

may be delayed over winter by lowering body temperature using roosts in the cooler areas of a cave. Pregnant females roost in large colonies in nursery caves. Birth generally occurs around December. Females cluster together in a roost that generally possesses a domed roof, which allows for the retention of warm air which may also promote faster growth. The young can fly by 7 weeks and reach adult size and are weaned by 10 weeks. The mothers then leave the cave to disperse to their winter roosts and a few weeks later, usually in March, there is a mass exodus of juveniles. The maternity colony is deserted by April. The longevity record for an Australian bat is from a pregnant female Large Bentwing-bat that was banded and recaptured 18 years later (she was again pregnant).

Bibliography:

Churchill, S (1998). Australian Bats. Reed New Holland Publishers, Sydney, Australia.

Dwyer, P.D. (1995). Common Bentwing-bat (*Miniopterus schreibersii*). In: The Mammals of Australia, pp: 494-495. Strahan, R. (Ed). Reed Books, Australia.

NPWS. (2003). Atlas of NSW Wildlife, at 'www.nationalparks.nsw.gov.au'.

Parnaby, H. (1992). An Interim Guide to Identification of Insectivorous Bats of South-eastern Australia. Technical Reports of the Australian Museum, Sydney.

- *Mormopterus norfolkensis*

Eastern Freetail-batConservation Status:

NSW (TSC Act 1995) – Vulnerable.

National (EPBC Act 1999) – Not Listed

Distribution:

This species is distributed along the east coast of New South Wales from south of Sydney extending north into south-eastern Queensland, near Brisbane. There are no records west of the Great Dividing Range.

Ecology and Habitat Requirements:

This species appears to live in Sclerophyll Forests and Woodland. Usually only solitary bats are captured, but one group was caught flying low over a rocky river in Rainforest and Wet Sclerophyll Forest. When hunting insects this species flies swiftly above the forest canopy or in clearings at the edge of the forest. Their diet is largely unknown. Small colonies have been found in tree hollows or under loose bark and specimens have been collected from under house roofs and the metal caps on telegraph poles. It commonly roosts with other species of bats, including *Scotorepens orion* (Eastern Broad-nosed Bat) and *Chalinolobus gouldii* (Gould's Wattled Bat).

Bibliography:

Allison, F.R. and Hoyer, G.A. (1995). Eastern Freetail-bat (*Mormopterus norfolkensis*). In: The Mammals of Australia, pp: 484-485. Strahan, R. (Ed). Reed Books, Australia.

Churchill, S. (1998). Australian Bats. Reed New Holland Publishers, Sydney, Australia.

NPWS Database (2000). Fauna Species List for Protected Areas in NSW, at <http://www.nationalparks.nsw.gov.au>

Parnaby, H. (1992). An Interim Guide to Identification of Insectivorous Bats of South-eastern Australia. Technical Reports of the Australian Museum, Sydney.

- *Nyctophilus timoriensis*

Greater Long-eared Bat

Conservation Status:

NSW (TSC Act 1995) – Vulnerable.

National (EPBC Act 1999) – Vulnerable

Distribution:

Overall, the distribution of the south eastern form coincides approximately with the Murray Darling Basin with the Pilliga Scrub region being the distinct stronghold for this species.

Ecology and Habitat Requirements:

This species inhabits a variety of vegetation types, including mallee, bullock (Allocasuarina leuhmanni) and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland.

N. timoriensis is a slow flying agile bat, utilising the understorey to hunt non-flying prey, especially caterpillars and beetles, and will even hunt on the ground. Mating takes place in autumn with one or two young born in late spring to early summer. This species roosts in tree hollows, crevices, and under loose bark.

Bibliography:

Churchill, S. (1998) Australian Bats. New Holland, Sydney.

Menkhorst, P. and Knight, F. (2001) A Field Guide to the Mammals of Australia. Oxford Uni Press, Melbourne.

• *Saccolaimus flaviventris***Yellow-bellied Sheathtail-bat****Conservation Status:**

NSW (TSC Act 1995) – Vulnerable.

National (EPBC Act 1999) – Not Listed

Distribution:

This species is widespread across Australia and its apparent rarity is probably due to its flying so high and fast that it is seldom collected.

Ecology and Habitat Requirements:

This species has been reported from a wide variety of habitats. Hunting height appears to vary depending upon the height of the dominant vegetation in Eucalypt forests it feeds above the canopy, but in Mallee or open country it comes lower to the ground. Prey species include Beetles, Long-horned Grasshoppers, Shield Bugs and Flying Ants.

Usually solitary, but occasionally occurring in colonies of less than ten individuals, the Yellow-bellied Sheathtail-bat roosts in tree hollows, animal burrows, dry clay cracks, under rock slabs and in abandoned Sugar Glider nests. It has also been found resting on the walls of buildings in broad daylight, and one such individual, caught at Queanbeyan (NSW), appeared to be so exhausted that it made no effort to escape. Similar reports suggest that it is migratory in southern Australia and that individuals found resting in the open are in the course of a winter migration from the cooler to warmer areas. They have been reported from southern Australia only between January and June.

Males have a prominent throat-pouch, which is devoid of glandular tissue, but a sub-cutaneous gland lies behind it. The throat-pouch is represented by a rudimentary fold of skin in the female. There is no seasonal difference in testicular size in males and there is no relationship between reproductive condition in males and the size of the throat pouch. Pregnancy is always restricted to the right uterine

horn. Single young are born between December and mid-March. Sub-adults have only been collected in January and February.

Bibliography:

Churchill, S. (1998). Australian Bats. Reed New Holland Publishers, Sydney, Australia.

NPWS. (2003). Atlas of NSW Wildlife, at 'www.nationalparks.nsw.gov.au'.

Richards, G.C. (1995). Yellow-bellied Sheath-tail-bat (*Saccolaimus flaviventris*). In: The Mammals of Australia, pp: 467. Strahan, R. (Ed). Australian Museum / Reed Books, Sydney.

- ***Scoteanax rueppellii***

Greater Broad-nosed BatConservation Status:

NSW (TSC Act 1995) – Vulnerable.

National (EPBC Act 1999) – Not Listed

Distribution:

The Greater Broad-nosed Bat occurs only along the eastern coastal strip of Queensland and NSW where it is restricted to the coast and adjacent areas of the Great Dividing Range. In NSW it extends as far south as the Bega Plain. They are only found at low altitudes (below 500m).

Ecology and Habitat Requirements:

This species apparently feeds on large moths and beetles, and some small vertebrates, emerging just after sundown, flying slowly and directly at a height of 3-6 metres, deviating only slightly to catch larger insects. It is also predatory on vertebrates including other bats, and is a noted carnivore on other captured bats in bat traps. *S. rueppellii* is known to hunt along tree-lined creeks, the junction of woodland and cleared paddocks, and low along rainforest creeks. It may have a preference for wet gullies in tall timber country.

The species roosts mainly in tree hollows but it has also been found in the roof spaces of old buildings. Little is known of the reproductive cycle, but it is suggested that the species follows the typical Vespertilionid pattern. What is known is that females congregate in maternity colonies and single young are born in January, slightly later than the other Vespertilionid bats that share its range. Males appear to be excluded from the colony during the birthing and rearing of the young.

Bibliography:

Churchill, S. (1998). Australian Bats. Reed New Holland Publishers, Sydney, Australia.

Hoye, G.A. and Richards, G.C. (1995). Greater Broad-nosed Bat (*Scoteanax rueppellii*). In: The Mammals of Australia, pp: 527-8. Strahan, R. (Ed). Australian Museum / Reed Books, Sydney.

NPWS. (2003). Atlas of NSW Wildlife, at 'www.nationalparks.nsw.gov.au'.

- ***Myotis macropus***

Large-footed Myotis

The Large-footed Myotis has been recorded along much of the coastal strip of Australia occurring from the east of South Australia, around the Victorian, New South Wales, Queensland and Northern Territory coasts and into Western Australia as far as the Kimberleys (the northern population is likely to be a different subspecies - currently undergoing taxonomic revision).

In N.S.W., the Large-footed Myotis is found in various habitats of the coast and adjacent ranges. Recently, it has also been found along the Murray River valley well into South Australia. It is a small

bat that hunts by raking the surface of the water for aquatic insects and small fish, it seldom occurs far from suitable water bodies which range from rainforest streams to large reservoirs and even brackish water. Some aerial hunting also occurs. Prey items include moths, beetles, crickets, cockroaches, flies and many water insects.

It roosts in small colonies of between 15 and several hundred individuals with recorded roosts including caves, mines and disused railway tunnels as well as dense rainforest foliage in the tropical parts of its range. Some occurrences of roosting in tree hollows are also noted. Males establish territories within the colony and monopolise a cluster of females during the breeding season. Outside the breeding season, males roost separately. The number of pregnancies per year varies with latitude. In N.S.W. and Victoria there is one pregnancy per year, the single young being born in November to December. In southern Queensland they produce two litters of single young in October and January. Males show two peaks of testicular development: in April to June and in September to November. Lactation lasts for about eight weeks and young born in late September suckle until late December. The bond between mother and young extends a further 3 to 4 weeks after weaning; they hunt together and roost together during this period. In northern Queensland they are reported to have three births per year.

Bibliography:

Churchill, S. (1998). Australian Bats. Reed New Holland Publishers, Sydney, Australia.

NPWS. (2003). Atlas of NSW Wildlife, at <http://www.nationalparks.nsw.gov.au>

Parnaby, H. (1992). An Interim Guide to Identification of Insectivorous Bats of South-eastern Australia. Technical Reports of the Australian Museum, Sydney.

Richards, G.C. (1995). Large-footed Myotis (*Myotis adversus*). In: The Mammals of Australia, pp: 521-523. Strahan, R. (Ed). Reed Books, Australia.

APPENDIX B:

FLORA LIST FOR THE STUDY AREA

FLORA SPECIES LIST

The following list includes all species of vascular plants observed on site during fieldwork. It should be noted that such a list cannot be considered comprehensive, but rather indicative of the flora. It can take many years of flora surveys to record all of the plant species occurring within any area, especially plant species that are only apparent in some seasons such as orchids.

A number of species cannot always be accurately identified during a brief survey, generally due to a lack of suitable flowering and/or fruiting material. Any such species are identified as accurately as possible, and are indicated in the list thus:

- * Specimens which could only be identified to genus level are indicated by the generic name followed by the abbreviation "sp.", indicating an unidentified species of that genus;
- * Specimens for which identification of the genus was uncertain are indicated by a question mark ("?",) placed in front of the generic, which is followed by the abbreviation "sp.";
- * Specimens which could be accurately identified to genus level, but could be identified to species level with only a degree of certainty are indicated by a ("?",) placed in front of the epithet.

Authorities for the scientific names are not provided in the list. These follow Harden (1991, 1992, 1993 and 2000). Names of families and higher taxa follow a modified Cronquist System (1981).

Introduced species are indicated by an asterisk ("*").

The following standard abbreviations are used to indicate subspecific taxa:

- ssp. - subspecies
- var.- variety
- × - hybrid between the two indicated species

FAMILY

Scientific Name

Common Name

CLASS MAGNOLIOPSIDA (FLOWERING PLANTS)

SUBCLASS MAGNOLIIDAE (Dicotyledons)

AMARANTHACEAE

**Alternanthera nana*

Hairy Joyweed

APIACEAE

**Apium leptophyllum*

Slender Celery

ASCLEPIADACEAE

**Gomphocarpus fruticosus*

Narrow-leaf Cotton Bush

ASTERACEAE

**Bidens pilosa*

Cobbler's Pegs

Chryscephalum apiculatum

Yellow Buttons

**Cirsium vulgare*

Spear Thistle

**Hypochoeris radicata*

Cat's Ear

Ozothamnus diosmifolium

Everlasting

**Senecio madagascariensis*

Fireweed

**Sonchus oleraceus*

Common Sowthistle

Vernonia cinerea var. *cinerea*

CACTACEAE

**Opuntia stricta* var. *stricta*

Prickly Pear

CAMPANULACEAE

Wahlenbergia gracilis

Native Bluebell

CASUARINACEAE

Allocasuarina luehmannii

Bulloak

FABACEAE

Daviesia ulicifolia ssp. *ulicifolia*

Glycine microphylla

Glycine tabacina

Love Creeper

Kennedia rubicunda

Dusky Coral Pea

**Trifolium repens*

White Clover

LOBELIACEAE

Pratia purpurascens

White Root

MALVACEAE

**Modiola caroliniana*

Red-flowered Mallow

**Sida rhombifolia*

Paddy's Lucerne

MIMOSACEAE

Acacia parvipinnula

MYRTACEAE

Angophora bakeri

Narrow-leaved Apple

Angophora floribunda

Rough-barked Apple

Corymbia maculata

Spotted Gum

Eucalyptus crebra

Narrow-leaved Ironbark

Eucalyptus fibrosa ssp. *fibrosa*

Broad-leaved Ironbark

Eucalyptus tereticornis

Forest Red Gum

OLEACEAE

**Olea europea ssp. cuspidata*

African Olive

OXALIDACEAE

**Oxalis corniculata*

Yellow Wood-sorrel

PITTOSPORACEAE

Bursaria spinosa

Blackthorn

Pittosporum undulatum

Sweet Pittosporum

PLANTAGINACEAE

**Plantago lanceolata*

Ribwort / Lamb's Tongues

POLYGONACEAE

Rumex sp.

Dock

PRIMULACEAE

**Anagallis arvensis*

Scarlet Pimpernel

SOLANACEAE

**Solanum nigrum*

Blackberry Nightshade

VERBENACEAE

**Verbena bonariensis*

Purple Top

**Verbena rigida*

VIOLACEAE

Viola hederacea

Native Violet

SUBCLASS LILIIDAE (Monocotyledons)

ANTHERICACEAE

Caesia parviflora

Blue-grass Lily

JUNCACEAE

**Juncus acutus ssp. acutus*

LILIACEAE

**Asphodelus fistulosus*

Onion Weed

POACEAE

Aristida ramosa

Three-awn Speargrass

**Briza maxima*

Quaking Grass

Cynodon dactylon

Common Couch

Cymbopogon refractus

Barbed-wire Grass

Digitaria sanguinalis

Summer Grass

Eragrostis brownii

Brown's Love Grass

Panicum simile

Two Colour Panic

**Paspalum dilatatum*

Paspalum

Sorghum leiocladum

Wild Sorghum

Themeda triandra

Kangaroo Grass

APPENDIX C

FAUNA LIST FOR THE STUDY AREA

FAUNA SPECIES LIST

Family sequencing and taxonomy follow for each fauna class:

Birds - Pizzey and Knight (1997).

Herpetofauna - Cogger (1996), Ehmann (Ed) (1997) and Barker, Grigg and Tyler (1995).

Mammals - Strahan (Ed) (1995) and Churchill (1998).

- Species observed or indicated by scats, tracks etc. on site during this investigation.

@ - Species recorded during previous surveys (Andrews Neil Pty Ltd 2000 & 2005).

#(?) - Indicates a species identified without certainty or to a Genus level only.

* - Indicates an introduced species.

Threatened species addressed within this assessment appear in **bold** font.

BIRDS

Family Anatidae - Ducks, Swans and Geese

Chenonetta jubata

Australian Wood Duck

Family Columbidae - Pigeons, Doves

Ocyphaps lophotes

Crested Pigeon

Family Cacatuidae - Cockatoos and Corellas

Cacatua roseicapilla

Galah

Family Halcyonidae - Tree Kingfishers

Dacelo novaeguineae

Laughing Kookaburra

Family Meliphagidae - Honeyeaters

Manorina melanocephala

Noisy Miner

Family Dicuridae - Monarchs, Flycatchers, Fantails, Drongo and Magpie-Lark

Grallina cyanoleuca

Magpie-lark

Family Artamidae - Wood-swallows, Butcherbirds, Magpie and Currawongs

Cracticus nigrogularis

Pied Butcherbird

Gymnorhina tibicen

Australian Magpie

Strepera graculina

Pied Currawong

REPTILES

Family Scinidae - Skinks

Lampropholis delicata

Grass Skink

MAMMALS

Family Phalangeridae - Brushtail Possums

<i>Trichosurus vulpecula</i>	Common Brushtail Possum
Family Macropodidae - Kangaroos, Wallabies	
<i>Macropus rufogriseus</i>	Red-necked Wallaby
Family Molossidae - Freetail-bats	
<i>Nyctinomus australis</i>	White-striped Freetail-bat
Family Vespertilionidae - Plain-nosed Bats	
<i>Chalinolobus gouldi</i>	Gould's Wattled bat
(?) <i>Vespadelus pumilus</i>	Eastern Forest Bat
(?) <i>Vespalechus vulturinus</i>	Little Cave Bat
Family Equidae	
* <i>Equus caballus</i>	Horse

APPENDIX D

MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE REPORT



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Protected Matters Search Tool

You are here: [Environment Home](#) > [EPBC Act](#) > [Search](#)

23 November 2010 15:52

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Information on the coverage of this report and qualifications on data supporting this report are contained in the [caveat](#) at the end of the report.

You may wish to print this report for reference before moving to other pages or websites.

The Australian Natural Resources Atlas at <http://www.environment.gov.au/atlas> may provide further environmental information relevant to your selected area. Information about the EPBC Act including significance guidelines, forms and application process details can be found at <http://www.environment.gov.au/epbc/assessmentsapprovals/index.html>



This map may contain data which are
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(Geoscience Australia)
© PSMA Australia Limited

Search Type: Point

Buffer: 10 km

Coordinates: -32.512552,151.171626



Report Contents: [Summary](#)

[Details](#)

- [Matters of NES](#)
- [Other matters protected by the EPBC Act](#)
- [Extra Information](#)
- [Caveat](#)
- [Acknowledgments](#)

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see <http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html>.

World Heritage Properties: None

National Heritage Places: None

Wetlands of International Significance: 1
(Ramsar Sites)

Commonwealth Marine Areas: None

Threatened Ecological Communities: 1

Threatened Species: 20

Migratory Species: 14

Other Matters Protected by the EPBC Act

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

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the

Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage/index.html>.

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at <http://www.environment.gov.au/epbc/permits/index.html>.

<u>Commonwealth Lands:</u>	3
Commonwealth Heritage Places:	None
<u>Places on the RNE:</u>	27
<u>Listed Marine Species:</u>	12
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

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

State and Territory Reserves:	None
Other Commonwealth Reserves:	None
<u>Regional Forest Agreements:</u>	1

Details

Matters of National Environmental Significance

Wetlands of International Significance [[Dataset Information](#)]
(Ramsar Sites)

HUNTER ESTUARY WETLANDS Within same catchment as Ramsar site

Threatened Ecological Communities [Dataset Information]	Status	Type of Presence
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area
Threatened Species [Dataset Information]	Status	Type of Presence

Birds

Anthochaera phrygia Regent Honeyeater	Endangered	Species or species habitat likely to occur within area
--	------------	--

Lathamus discolor

Swift Parrot

Endangered Species or species habitat likely to occur within area

Rostratula australis

Australian Painted Snipe

Vulnerable Species or species habitat may occur within area

Frogs*Litoria aurea*

Green and Golden Bell Frog

Vulnerable Species or species habitat may occur within area

Litoria booroolongensis

Booroolong Frog

Endangered Species or species habitat may occur within area

Mixophyes balbus

Stuttering Frog, Southern Barred Frog (in Victoria)

Vulnerable Species or species habitat likely to occur within area

Mixophyes iteratus

Southern Barred Frog, Giant Barred Frog

Endangered Species or species habitat likely to occur within area

Mammals*Chalinolobus dwyeri*

Large-eared Pied Bat, Large Pied Bat

Vulnerable Species or species habitat may occur within area

Dasyurus maculatus maculatus (SE mainland population)

Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)

Endangered Species or species habitat may occur within area

Nyctophilus timoriensis (South-eastern form)

Greater Long-eared Bat, South-eastern Long-eared Bat

Vulnerable Species or species habitat may occur within area

Petrogale penicillata

Brush-tailed Rock-wallaby

Vulnerable Species or species habitat may occur within area

Pseudomys novaehollandiae

New Holland Mouse

Vulnerable Species or species habitat likely to occur within area

Pseudomys oralis

Hastings River Mouse

Endangered Species or species habitat likely to occur within area

Pteropus poliocephalus

Grey-headed Flying-fox

Vulnerable Roosting known to occur within area

Plants*Cryptostylis hunteriana*

Leafless Tongue-orchid

Vulnerable Species or species habitat may occur within area

Eucalyptus glauca

Slaty Red Gum

Vulnerable Species or species habitat likely to occur within area

Euphrasia arguta

Extinct Species or species habitat may occur within area

Prasophyllum sp. Wybong (C. Phelps ORG 5269)
a leek-orchid

Critically Endangered Species or species habitat may occur within area

Pterostylis gibbosa

Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood

Endangered Species or species habitat may occur within area

Thesium australe

Austral Toadflax, Toadflax

Vulnerable Species or species habitat likely to occur within area

Migratory Species [Dataset Information]	Status	Type of Presence
Migratory Terrestrial Species		
Birds		
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle	Migratory	Species or species habitat likely to occur within area
<i>Hirundapus caudacutus</i> White-throated Needletail	Migratory	Species or species habitat may occur within area
<i>Merops ornatus</i> Rainbow Bee-eater	Migratory	Species or species habitat may occur within area
<i>Monarcha melanopsis</i> Black-faced Monarch	Migratory	Breeding may occur within area
<i>Myiagra cyanoleuca</i> Satin Flycatcher	Migratory	Breeding likely to occur within area
<i>Rhipidura rufifrons</i> Rufous Fantail	Migratory	Breeding may occur within area
<i>Xanthomyza phrygia</i> Regent Honeyeater	Migratory	Species or species habitat likely to occur within area
Migratory Wetland Species		
Birds		
<i>Ardea alba</i> Great Egret, White Egret	Migratory	Species or species habitat may occur within area
<i>Ardea ibis</i> Cattle Egret	Migratory	Species or species habitat may occur within area
<i>Gallinago hardwickii</i> Latham's Snipe, Japanese Snipe	Migratory	Species or species habitat may occur within area
<i>Rostratula benghalensis s. lat.</i> Painted Snipe	Migratory	Species or species habitat may occur within area
Migratory Marine Birds		
<i>Apus pacificus</i> Fork-tailed Swift	Migratory	Species or species habitat may occur within area
<i>Ardea alba</i> Great Egret, White Egret	Migratory	Species or species habitat may occur within area
<i>Ardea ibis</i> Cattle Egret	Migratory	Species or species habitat may occur within area
Other Matters Protected by the EPBC Act		
Listed Marine Species [Dataset Information]	Status	Type of Presence
Birds		
<i>Apus pacificus</i> Fork-tailed Swift	Listed - overfly marine area	Species or species habitat may occur within area
<i>Ardea alba</i> Great Egret, White Egret	Listed - overfly marine	Species or species habitat may occur within area

	area	
<u><i>Ardea ibis</i></u> Cattle Egret	Listed - overfly marine area	Species or species habitat may occur within area
<u><i>Gallinago hardwickii</i></u> Latham's Snipe, Japanese Snipe	Listed - overfly marine area	Species or species habitat may occur within area
<u><i>Haliaeetus leucogaster</i></u> White-bellied Sea-Eagle	Listed	Species or species habitat likely to occur within area
<u><i>Hirundapus caudacutus</i></u> White-throated Needletail	Listed - overfly marine area	Species or species habitat may occur within area
<u><i>Lathamus discolor</i></u> Swift Parrot	Listed - overfly marine area	Species or species habitat likely to occur within area
<u><i>Merops ornatus</i></u> Rainbow Bee-eater	Listed - overfly marine area	Species or species habitat may occur within area
<u><i>Monarcha melanopsis</i></u> Black-faced Monarch	Listed - overfly marine area	Breeding may occur within area
<u><i>Myiagra cyanoleuca</i></u> Satin Flycatcher	Listed - overfly marine area	Breeding likely to occur within area
<u><i>Rhipidura rufifrons</i></u> Rufous Fantail	Listed - overfly marine area	Breeding may occur within area
<u><i>Rostratula benghalensis s. lat.</i></u> Painted Snipe	Listed - overfly marine area	Species or species habitat may occur within area

Commonwealth Lands [[Dataset Information](#)]

Communications, Information Technology and the
Arts - Telstra Corporation Limited

Defence - Defence Housing Authority

Unknown

Places on the RNE [[Dataset Information](#)]

Note that not all Indigenous sites may be listed.

Historic

[All Saints Anglican Church Group NSW](#)

[Arderseir and Garden NSW](#)

[Boer War Memorial Obelisk NSW](#)

[Bon Accord NSW](#)

[Caledonian Hotel NSW](#)

[Club House Hotel Group NSW](#)

[Club House Hotel NSW](#)

[Convent of Mercy \(Current Buildings\) NSW](#)

[Convent of Mercy \(Original Building\) NSW](#)

[Convent of Mercy Group NSW](#)

[Council Chambers \(former\) NSW](#)

[Craill House NSW](#)

[Criterion Hotel NSW](#)

[Ewbank and Outbuildings NSW](#)

[Glenayr Including Fence NSW](#)

[Greenwood and Outbuildings NSW](#)

[Middle Falbrook Road Bridge NSW](#)

[Pelerin NSW](#)

[Percy Hotel NSW](#)

[Railway Station NSW](#)

[Redbourneberry Bridge NSW](#)

[Shire Council Technical Offices NSW](#)

[Singleton Conservation Area NSW](#)

[Singleton Courthouse NSW](#)

[Singleton Post Office and Stables \(former\) NSW](#)

[St Patricks Catholic Church NSW](#)

[Wade Cottage NSW](#)

Extra Information

Regional Forest Agreements [[Dataset Information](#)]

Note that all RFA areas including those still under consideration have been included.

North East NSW RFA, New South Wales

Caveat

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

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the *Environment Protection and Biodiversity Conservation Act 1999*. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and

marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

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

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

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under "type of presence". For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the [migratory](#) and [marine](#) provisions of the Act have been mapped.

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

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

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

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

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

Acknowledgments

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

- [New South Wales National Parks and Wildlife Service](#)
- [Department of Sustainability and Environment, Victoria](#)
- [Department of Primary Industries, Water and Environment, Tasmania](#)
- [Department of Environment and Heritage, South Australia Planning SA](#)
- [Parks and Wildlife Commission of the Northern Territory](#)
- [Environmental Protection Agency, Queensland](#)
- [Birds Australia](#)

- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)
- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)
- [State Herbarium of South Australia](#)
- [Northern Territory Herbarium](#)
- [Western Australian Herbarium](#)
- [Australian National Herbarium, Atherton and Canberra](#)
- [University of New England](#)
- Other groups and individuals

[ANUcliM Version 1.8, Centre for Resource and Environmental Studies, Australian National University](#) was used extensively for the production of draft maps of species distribution. Environment Australia is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

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[Department of the Environment, Water, Heritage and the Arts](#)

GPO Box 787 Canberra ACT 2601 Australia

Telephone: +61 (0)2 6274 1111

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