

4.3 Flora and fauna habitats

4.3.1 Crooked River (Site 27)

The majority of native vegetation in the study area at Crooked River has previously been cleared for grazing lands and rail infrastructure. Native vegetation is now confined to a narrow strip of regrowth extending an average of less than 10 m from the water edge. In recent years fence installation has restricted grazing along the water edge, allowing some regeneration of native vegetation. Vegetation surveyed at this site was identified as **estuarine fringe forest** (DEC 2005q) and is the only recorded occurrence of this community in the study area. Isolated paddock trees indicate that this community may have graded into floodplain swamp forest, which has long since been cleared for grazing.

Due to past and ongoing disturbances the vegetation across **Site 27** was assessed as being in poor condition. The natural vegetation layers are no longer intact and a high percentage of weed cover is present. Outside of the fenced edge, the ground layer is dominated by exotic pasture species such as *Stenotaphrum secundatum* and *Pennisetum clandestinum*. These cleared and grazed areas were considered to have little or no capacity for natural regeneration. Nevertheless, the plant species within the fenced area were predominantly salt tolerant native ground layer species. Long term disturbance has altered the structure of this community and the natural vegetation strata or layers are no longer intact. The canopy of *Casuarina glauca* is largely represented by immature regrowth with a few mature individuals scattered across the site.

Fauna habitats at **Site 27** are in poor condition. Typical fauna roosting and or shelter sites such as hollow bearing trees, hollow logs, and dense undergrowth are largely absent. Despite this, the tidal flats of the Crooked River and its tributaries are considered to provide feeding resources and potential waterbird habitat.

4.3.2 Toolijooa River and Harley Hill (Sites 1, 2, 17, 18 and 19)

Native vegetation along Toolijooa ridge and Harley Hill is now confined to five discontinuous patches of remnant and regrowth on the uppermost hilltops and steep rocky and inaccessible slopes. Vegetation communities on these sites include subtropical complex rainforest which grades into **warm temperate layer forest** further down slope and along edges. Ongoing disturbances such as grazing and a high degree of weed invasion continue to threaten the integrity of flora and fauna habitats at each of these sites.

Vegetation condition at these sites is highly variable and ranges from very poor in the cleared exotic pasture to good in areas of highly diverse native vegetation. The condition of vegetation at each site was considered in poor condition along edges where large infestations of *Lantana camara* are present and have displaced most native species. These edges were considered to have little or no capacity for the regeneration of natural vegetation without significant resources allocated to weed control and revegetation. Patches of *L. camara* were also dispersed within the native remnants, especially where disturbances have created gaps in the remnant canopy.

Warm temperate layer forest at these sites appeared to more susceptible to the invasion of *L. camara* and as a result was mostly in poor condition. The area down slope of these remnants is highly disturbed and cleared with most areas in poor condition. Regrowth vegetation in these areas is limited to a discontinuous canopy of *Acacia maidenii* with a dense weed infested understorey. These areas were considered to have little or no capacity for the regeneration of natural vegetation.

The core areas of remnant vegetation at each of the sites contained subtropical complex rainforest, often in good condition. Although evidence of previous disturbances such as logging was evident, the dense canopy layers have helped reduce the dispersal of weeds within each remnant. **Subtropical complex rainforest** present at each site varied in its structure and diversity. The core of the remnant patch at **Site 23**, although relatively small, was considered to be in good condition with all structural layers intact and a high diversity of native species present. A large proportion of **Site 1**, the largest remnant of this community surveyed in the study area covering approximately 20 hectares, is also in good condition.

The condition of fauna habitats at each of these sites was also highly variable from poor to good condition. Although many sites were in poor condition, a variety of feeding and sheltering resources were observed. A large proportion of surface rock and outcropping is present at each of these sites, particularly under the sheltered rainforest canopy at **Site 1**. Such rock outcrops are likely to provide shelter for a variety of mammals including bush rat *Rattus fuscipes* and brown antechinus *Antechinus stuartii*. Hollow bearing trees were scarce, but were present and may provide nesting and roosting habitat for various birds, bats and small mammals. Plant species within the **warm temperate layer forest** and **subtropical complex rainforest** remnants are also likely to provide feeding resources. Myrtaceaeous trees (mostly eucalyptus species) within the **warm temperate layer forest** canopy, provide direct (foliage, nectar, exudates) and indirect (arthropods) food for a range of vertebrates, particularly birds and arboreal mammals. Flowering and fruiting trees such as *Ficus* spp. and *Livistona australis* are common at each site and are likely to provide important feeding resources for a range of insects and nectivorous and frugivorous vertebrates.

4.3.3 Broughton Creek (Sites 17, 28 and 29)

Native vegetation along Broughton Creek is now largely restricted to a thin riparian corridor with patches of remnant and regrowth. Plant communities at these sites include **riverbank forest** which grades into **warm temperate layer forest** and **subtropical complex rainforest** at **Sites 17 and 28**. Ongoing disturbances such as grazing, erosion and a high degree of weed invasion have had a major impact on habitat condition at each of these sites.

The condition of vegetation present within the riparian zone at all three sites was poor. Natural structural layers are no longer intact and in most areas the mid storey and ground layers are completely dominated by weed species including *Ligustrum sinense*, *Lantana camara*, *Solanum mauritianum*, *Ageratina riparia* and *Tradescantia fluminescens*. These weed infested areas were considered to have little capacity for the regeneration of natural vegetation without significant resources allocated to weed control and revegetation.

Site 29 was in poor condition despite the exclusion of grazing by fencing of the riparian zone. **Site 29** has a tall native canopy of *Casuarina cunninghamiana* and an understorey completely dominated by a high density weed infestation. **Site 28** is similarly impacted by weed infestations in addition to some areas where grazing and trampling by stock has left the creek bank bare and eroded. Vegetation upslope and to the western side of **Site 28** was identified as **subtropical complex rainforest** and **warm temperate layer forest**. These remnants were also in poor condition and subject to disturbances and a high degree of weed infestation. As with the adjacent riparian vegetation, these areas have little capacity for the regeneration of natural vegetation without significant resources allocated to weed control and revegetation.

Regardless of the degraded nature of much of the area observed along Broughton Creek, many sites contained mature casuarina trees with hollows. These trees provide potential roost sites for fauna, particularly microchiropteran bats that were scarce or absent throughout much of the study area.

The riparian zone of **Site 17** is in moderate condition and despite competition from weeds; the natural layers of vegetation appear relatively intact. A suite of native rainforest species are present on the site and vegetation upslope and to the east of Broughton Creek is represented by **warm temperate layer forest** and **subtropical complex rainforest** which is in moderate to good condition away from its disturbed edges.

4.3.4 Beach Road and west Toolijooa Road (Sites 3, 4, 6, 7, 8, 9, 24 and 25)

Native vegetation on the foothills and floodplain near Beach Road and the western end of Toolijooa includes several open forest remnants and regrowth vegetation. Vegetation communities across these sites include **Illawarra gully wet forest**, **floodplain swamp forest** and **South Coast grassy woodland**. Historic disturbances such as grazing and clearing have altered the structure of these communities and some areas have significant weed infestations.

Coastal sand swamp forest covering an area of approximately 15 hectares is located on the low lying areas to the south east side of **Site 3**. The occurrence of this forest type was the only one recorded within the study area. This vegetation is in good condition despite evidence of logging. All natural structural layers are intact and weed species were confined to minor infestations along some disturbed access trails and edges.

In the elevated northern and western portions of **Site 3** the vegetation grades into **Illawarra gully wet forest** which covers an area of approximately 20 hectares. A large proportion of this vegetation is in poor to moderate condition and the understorey is often dominated by *Lantana camara*. Despite lantana infestation this vegetation exhibits a reasonable capacity for the regeneration of natural vegetation provided weed control practices are implemented.

Illawarra gully wet forest is also the dominant community to the west at **Sites 4, 6, 7, 9 and 25**. The condition of vegetation at these sites is again in moderate condition with large patches of *Lantana camara* dispersed throughout. Areas without lantana infestation were in good condition and had intact native under stories with a diversity of native shrub and ground layer species. A small area of **South Coast grassy woodland** in moderate condition was recorded on **Site 25**. This community is mapped along the eastern edge of a larger patch of **Illawarra gully wet forest**.

Further west and along Beach Road, remnants of **Illawarra gully wet forest** grade into **warm temperate layer forest** (see **Sites 8 and 24**). These sites are in moderate condition with most natural structural layers intact and a diverse suite of native understorey and ground layer species present. Weed control is currently being undertaken in these remnants and the regeneration of native species was evident.

The animal habitats within each site at Beach Road and western Toolijooa Road are varied. Hollow bearing trees are scarce at all sites, but those present may provide nesting and roosting habitat for various birds, bats and small mammals. Micro-habitat features such as logs, dense undergrowth and leaf litter were also present, offering habitat to a range of species. Plant species within the all remnants at these sites are also likely to provide feeding resources. Myrtaceaeous trees (mostly eucalyptus species) dominate the canopy, providing direct (foliage, nectar, exudates) and indirect (arthropods) food for a range of vertebrates, particularly birds and arboreal mammals.

4.3.5 Princes Highway at Tindalls Lane (Sites 15, 16 and 22)

Adjacent to Tindalls Lane and on the north side of the Princes Highway is an area of remnant vegetation that covers about 60 hectares (**Sites 15 and 16**) and is one of the largest areas of native vegetation surveyed in the study area. Two plant communities were present: **Illawarra gully wet forest** and **warm temperate layer forest**. Historic disturbances such as logging have altered the structure of these communities and weed infestations are dispersed throughout each site.

The majority of **Site 15** is covered by **Illawarra gully wet forest**. Vegetation at this site is in moderate condition due to dense infestation of *Lantana camara* scattered throughout. Where dense patches of lantana were absent the native shrub layer remains intact. Despite lantana infestation this vegetation exhibited a reasonable capacity for the regeneration of natural vegetation provided weed control practices are implemented.

A small drainage line runs along the south west of **Site 15** and vegetation along this portion of the site is represented by **warm temperate layer forest** in moderate condition. **Warm temperate layer forest** is also present to the north west on **Site 16**. Vegetation on **Site 16** is in a moderate to good condition with patchy infestations of *Lantana camara* and *Tradescantia fluminensis*. Despite these weed infestation the vegetation across **Site 16** exhibited a reasonable capacity for the regeneration of natural vegetation provided weed control practices are implemented. The northern and eastern edges of **Site 16** grade into **Illawarra gully wet forest** which is also in moderate condition.

The animal habitats at these sites were varied. Hollow bearing trees were scarce, but those present may provide nesting and roosting habitat for various birds, bats and arboreal mammals. Small scale habitat features such as logs, dense undergrowth and leaf litter were also present, offering further habitat opportunities to a range of species. Plant species within the remnant are also likely to provide feeding resources. Myrtaceaeous trees (mostly eucalyptus species) dominate the canopy, providing direct (foliage, nectar, exudates) and indirect (arthropods) food for a range of vertebrates, particularly birds and arboreal mammals.

4.3.6 Flying Fox Creek and Jaspers Creek (Sites 30 and 31)

Native vegetation at **Sites 30 and 31** is largely restricted to a thin riparian corridor with patches of disturbed remnant and regrowth. Vegetation communities on these sites include **riverbank forest** which grades into warm **Illawarra gully wet forest** at **Site 30**. Ongoing disturbances such as grazing, erosion and a high degree of weed invasion have had a major impact on habitat condition at each of these sites.

The condition of vegetation present within the riparian zone at both sites is poor. Both sites have a tall native canopy *Casuarina cunninghamiana* but natural understorey layers are no longer intact and in most areas the mid storey and ground layers are either absent or completely dominated by weed species, including *Salix babylonica*, *Lantana camara*, and *Tradescantia fluminensis*. These cleared and weed infested areas have little capacity for the regeneration of natural vegetation without significant resources allocated to weed control and revegetation.

Both sites are heavily grazed which has left the creek bank bare and eroded. Vegetation upslope of the creek banks on **Site 30** was identified as remnant and regrowth **Illawarra gully wet forest**. This area is in poor condition and subject to disturbances and a high degree of weed infestation. These areas have little capacity for the regeneration of natural vegetation without significant resources allocated to weed control and revegetation.

Regardless of the degraded nature of these areas, many sites contained mature casuarina trees with hollows. These trees provide potential roost sites for fauna, particularly microchiropteran bats, that were scarce or absent throughout much of the study area.

4.3.7 Devitts Lane and Bomaderry (Sites 10, 11 and 12)

Native vegetation adjacent to Devitts Lane at Meroo Meadow and on the north side of Bomaderry is distinctly different from that surveyed in all other sections of the study area. **Currambene lowlands forest** was the dominant vegetation type. Disturbances including grazing, logging and clearing have altered much of the natural vegetation once present on these sites.

The vegetation at **Site 10** was assessed as moderate in condition. **Site 10** is dominated by a relatively young canopy of *Corymbia maculata* with a diverse range of native shrub and ground layers species. Weed densities across this site are low and predominately scattered along the edges. This vegetation was considered to have a good capacity for regeneration to a near natural state.

The understorey of **Currambene lowlands forest** to the west of **Site 10** and along Devitts Road (**Site 12**) has been heavily cleared and grazed and is in poor condition. Remaining native vegetation is largely represented by the canopy trees only, the native understorey is absent and scattered patches of exotic weeds such as *Lantana camara* now dominate. These areas were considered to have little capacity for the regeneration of natural vegetation without significant resources allocated to weed control and revegetation.

Vegetation on the eastern side of the Princes Highway was identified as **Currambene lowlands forest**, although a different suite of native species were present. The council reserve to the north east of **Site 11** has a dominant canopy of *Eucalyptus sclerophylla* and *Corymbia gummifera* with an understorey of *Allocasuarina littoralis* and *Banksia spinulosa*. These species indicate a change from **Currambene lowlands forest** to a sandstone woodland community. This portion of **Site 11** is in good condition.

The animal habitats at these sites are generally in poor condition. Hollow bearing trees and small scale habitat features such as logs, dense undergrowth was largely absent. Plant species within the remnant are likely to provide feeding resources. Myrtaceae trees (mostly eucalyptus species) dominate the canopy, providing direct (foliage, nectar, exudates) and indirect (arthropods) food for a range of vertebrates, particularly birds and arboreal mammals.

4.4 Plant species

A total of 370 species were recorded in the study area, comprising 306 (83%) native species and 64 (17%) exotic species. It should be noted that surveys focused on areas supporting native vegetation.

Nine of the exotic species recorded in the study area are listed as noxious weeds in the Shoalhaven and/or Kiama LGAs: *Lycium ferocissimum* (Class 4), *Rubus fruticosus* (Class 4), *Ageratina adenophora* (Class 4), *Senecio madagascariensis* (Class 4), *Lantana camara* (Class 4 and 5), *Ageratina riparia* (Class 4), *Ligustrum lucidum* (Class 4), *Ligustrum sinense* (Class 4), *Salix babylonica* (Class 5). The legal requirements of the classes of noxious weeds are:

- a) Class 4 - The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority; and
- b) Class 5 - The requirements in the *Noxious Weeds Act 1993* for a notifiable weed must be complied with

4.4.1 Threatened plant species

Thirty one threatened flora species and/or their habitat have been recorded within 10 km of the study area (**Table 7**).

Table 7 Threatened species listed on the TSC Act and/or the EPBC Act that are likely to occur within 10 km of the study area (DECC Atlas of NSW Wildlife and DEWR EPBC online database)

Species	Status			Habitat	Potential habitat
	EPBC Act ¹	TSC Act ²	ROTAP ³		
<i>Acacia bynoeana</i>	V	E1	3V	Bynoe's wattle is found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. It has recently been found in the Colymea and Parma Creek areas west of Nowra. Occurs in heath or dry sclerophyll forest on sandy soils. Seems to prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches (DEC 2005a).	No.
<i>Acacia terminalis</i> ssp. <i>terminalis</i>	E	E1	2Ri	Recent collections have only been made from the Quarantine Station, Clifton Gardens, Dover Heights, Parsely Bay, Nielson Park, Cooper Park, Chifley and Watsons Bays. Prefers coastal scrub and dry sclerophyll woodland on sandy soils. Most areas of habitat or potential habitat are small and isolated. Most sites are highly modified or disturbed due to surrounding urban development. Flowers in autumn (DEC 2005b).	Yes. Currumbene lowlands forest.
<i>Boronia deanei</i>	V	V	3Va	Wet heath vegetation (Fairley and Moore 1995). There are scattered populations of Deane's Boronia between the far south-east of NSW and the Blue Mountains (including the upper Kangaroo River near Carrington Falls, the Endrick River near Nerriga and Nalbaugh Plateau), mainly in conservation reserves. Grows in wet heath, often at the margins of open forest adjoining swamps or along streams (DEC 2005c).	No. No applicable swamps or wet heath in study area.
<i>Caladenia tessellata</i>	V	E1	3V	Low open forest with heath or sometimes grass understorey this species only grows in very dense shrubbery in coastal areas (Bishop 1996). Currently known from two disjunct areas: Braidwood on southern tablelands and three populations in Wyong area on the Central Coast (DEC 2005d).	No. No low open forest or heath in study area.
<i>Chamaesyce psammogeton</i>	-	E1	-	A coastal species which is found on foredunes and exposed headlands (NSW Scientific Committee 1998) along the coast from south of Jervis Bay to Queensland (and Lord Howe Island). Populations have been recorded in Wamberal Lagoon Nature Reserve, Myall Lakes National Park and Bundjalung National Park. Flowering occurs in summer. <i>C. psammogeton</i> seeds float, so some dispersal between beaches may occur. Likes disturbed edges of tracks leading through foredunes (N.Smith pers. Comm.)	No. No foredunes or exposed headlands in study area.

Table 7 cont'd.

Species	Status			Habitat	Potential habitat
	EPBC Act ¹	TSC Act ²	ROTAP ³		
<i>Cryptostylis hunteriana</i>	V	V	3VC-	This species typically grows in swamp-heath on sandy soils chiefly in coastal districts (Harden 1993) but has also been recorded on steep bare hillsides (Bishop 1996). This species does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by Scribbly Gum (<i>Eucalyptus sclerophylla</i>), Silvertop Ash (<i>E. sieberi</i>), Red Bloodwood (<i>Corymbia gummifera</i>) and Black Sheoak (<i>Allocasuarina littoralis</i>); appears to prefer open areas in the understorey of this community and is often found in association with the large tongue orchid (<i>C. subulata</i>) (DEC 2005e).	Yes Currumbene lowlands forest.
<i>Cynanchum elegans</i>	E	E1	3Ei	Rainforest gullies scrub and scree slopes in Gloucester and Wollongong districts (Harden 1992). Occurs mainly at the ecotone between dry subtropical rainforest and sclerophyll forest / woodland communities (NPWS 2002a). Has been recorded in dry subtropical rainforest, littoral rainforest, <i>Leptospermum laevigatum</i> - <i>Banksia integrifolia</i> coastal scrub, <i>Eucalyptus tereticornis</i> forest and woodland, <i>Corymbia maculata</i> forest and woodland and <i>Melaleuca armillaris</i> scrub to open scrub (NPWS 2002a).	Yes. In subtropical complex rainforest and warm temperate layered forest.
<i>Daphnandra</i> sp. C 'Illawarra'	E	E1	2Vi	Occupies the rocky hillsides and gullies of the Illawarra lowlands, occasionally extending onto the upper escarpment slopes. Associated vegetation includes rainforest and moist eucalypt forest (DEC 2005g).	Yes. Recorded in study area in subtropical complex rainforest and warm temperate layered forest.
<i>Eucalyptus langleyi</i>	-	V	2V	The main occurrence of the Albatross Mallee is to the south-west of Nowra as far as Yarramunmun Creek. It is also found to a limited extent north of the Shoalhaven River in the vicinity of Bomaderry Creek. Found in mallee shrubland on poorly-drained, shallow, sandy soils on sandstone. The species regenerates from rootstock after fire (DEC 2005i).	Yes. Recorded in study area in Currumbene lowlands forest.
<i>Eucalyptus sturgissiana</i>	-	V	2Ra	The Ettrema Mallee is mostly restricted to the Northern Budawang Range in Morton National Park, with a few occurrences on the nearby coastal plain. Usually grows as an emergent in low shrub-heath. Grows on sandy, swampy soils (DEC 2005j).	No. No emergent low shrub-heath in study area.

Table 7 cont'd.

Species	Status			Habitat	Potential habitat
	EPBC Act ¹	TSC Act ²	ROTAP ³		
<i>Galium australe</i>	-	E1	-	In NSW Tangled Bedstraw has been found in moist gullies of tall forest, <i>Eucalyptus tereticornis</i> forest, coastal Banksia shrubland, and <i>Allocasuarina nana</i> heathland. (NPWS 2005). Known from the Towamba Valley near Bega, Lake Yarrunga near Kangaroo Valley, Cullendulla Creek Nature Reserve near Batemans Bay, Conjola National Park, Swan Lake near Swanhaven, and the Big Hole in Deua National Park. It was recorded historically from the Clyde River near Batemans Bay and the Mongarlowe area near Braidwood. The species also occurs beside Lake Windemere in the Australian Capital Territory at Jervis Bay. Most flowering collections have been made in late spring to early autumn (DEC 2005k).	Yes. Warm temperate layered forest and Illawarra wet gully forest.
<i>Genoplesium baueri</i>	-	V	3R	This terrestrial orchid species grows in open sclerophyll forest or moss gardens on sandstone. Typically the habitat is a drier heathy forest (Harden 1993, Bishop 1996). The species has been recorded from locations between Nowra and Pittwater and may occur as far north as Port Stephens. About half the records were made before 1960 with most of the older records being from Sydney suburbs including Asquith, Cowan, Gladesville, Longueville and Wahrenonga. No collections have been made from those sites in recent years. Flowers Dec. - Mar (DEC 2005l).	No. No heathy forest in study area.
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	-	V	-	Sporadically distributed throughout the Sydney Basin with the main occurrence centred around Picton, Appin and Bargo. Separate populations are also known further north from Putty to Wyong and Lake Macquarie on the Central Coast and Cessnock and Kurri Kurri in the Lower Hunter. Grows in sandy or light clay soils usually over thin shales. Occurs in a range of vegetation types from heath and shrubby woodland to open forest. Often occurs in open, slightly disturbed sites such as along tracks. Flowering has been recorded between July to December as well as April to May (DEC 2005m).	No.

Table 7 cont'd.

Species	Status			Habitat	Potential habitat
	EPBC Act ¹	TSC Act ²	ROTAP ³		
<i>Grevillea rivularis</i>	E	E1	2Vi	The Carrington Falls <i>Grevillea</i> is confined to the Carrington Falls area on the upper Kangaroo River west of Kiama, within Budderoo National Park. The Carrington Falls <i>Grevillea</i> is found mainly on moist creek-sides on sandstone in open heath or eucalypt woodland. It had been regarded as restricted to the water's edge but the recent discovery of a small population of mature individuals in woodland at least 500m from the water's edge raises doubt about this assumption. The woodland population may represent a rare establishment event although it is more likely that the species was once more widespread in the landscape and has been pushed to the waterside habitat by increased fire in the landscape (DEC 2005n).	No. No open heath or eucalypt woodland along moist creek sides in study area.
<i>Ireneparsus trypherus</i>	E	E1	2Ei	Occurs on coast and escarpment between Wollongong and the Shoalhaven River (Harden 1990). Typically inhabits steep rocky slopes near cliff lines and ridge tops. The species is less typically found growing out of rock crevices or on narrow benches along cliff lines. The vast majority of sites are recorded from the upper slopes of the ridge systems that extend south and east of the Illawarra escarpment, although the species has also been recorded from the deep sandstone gorges of the Shoalhaven River. Associated vegetation includes moist sclerophyll forest, Ironwood <i>Backhousia myrtifolia</i> thicket, and rainforest (DEC 2005o).	Yes. Subtropical complex rainforest, Illawarra gully wet forest and warm temperate layered forest.
<i>Melaleuca deanei</i>	V	V	3R	Grows in wet heath on sandstone (Harden 1991). Occurs in two distinct areas of Sydney (Ku-Ring-Gai / Berowra and Holsworthy / Wedderburn) and has isolated occurrences in the Blue Mountains, Nowra and Central Coast areas (DEC 2005p). The species grows in heath on sandstone. Flowers appear in summer but seed production appears to be small and consequently the species exhibits a limited capacity to regenerate.	No. No wet heath on sandstone in study area.
<i>Persoonia glaucescens</i>	V	E1	2V	Woodland to dry sclerophyll forest on sandstone from Picton to Bargo (Harden 1991). More specifically this species prefers clayey and gravely laterites with ridgetops, plateaus and upper slopes being preferred topography (NPWS 2000)	No. study area outside known range for the species.

Table 7 cont'd.

Species	Status			Habitat	Potential habitat
	EPBC Act ¹	TSC Act ²	ROTAP ³		
<i>Pimelea spicata</i>	E	E1	3Ei	In western Sydney, <i>P. spicata</i> is restricted to areas supporting, or that previously supported, Cumberland plain woodland. <i>Pimelea spicata</i> has been recorded from both shale hills and shale plains woodland. <i>Pimelea spicata</i> has also been recorded from highly degraded areas that no longer support native vegetation, but that would have supported CPW previously (DEC 2004). In the coastal Illawarra it occurs commonly in Coast Banksia open woodland with a more well developed shrub and grass understorey.	No. No Cumberland plain woodland or coast banksia open woodland in study area.
<i>Pomaderris parrisiae</i>	V	V	2V	Parris' Pomaderris has been recorded in Egan Peaks Nature Reserve, Wadbilliga National Park (near Wadbilliga Trig.) and South East Forests National Park (Brown Mountain / Cochrane Dam area), with a questionable record in Ben Boyd National Park. Parris' Pomaderris is found on skeletal soils in rocky shrubland, tall open forest or rainforest, chiefly on escarpment ranges (DEC 2005r).	Yes. Subtropical complex rainforest, warm temperate layered forest and Illawarra gully wet forest
<i>Prasophyllum affine</i>	E	E1	2E	Jervis Bay Leek Orchid is currently known from three areas south-east of Nowra on South Coast. These are Kinghorne Point, Wowly Gully near the town of Callala Bay, and near the township of Vincentia. Grows on poorly drained clay soils that support low heathland and sedgeland communities. Flowers are followed by a fleshy seed capsule. Plants retreat into subterranean tubers after fruiting, so are not visible above-ground (DEC 2005s).	No. No low heathland or sedgeland in study area.
<i>Prasophyllum fuscum</i>	V	V	2V	Grows in moist heath, often along seepage lines; confined to the Blue Mtns and Hawkesbury sandstone (Harden 1993). Some authorities believe <i>Prasophyllum</i> species from this area are not <i>P. fuscum</i> , but an undescribed species. In addition, some authorities believe it is identical to <i>P. uroglossum</i> which occurs in the Wingecarribee area (DEC 2005t).	No. No moist heath in study area.
<i>Prostanthera densa</i>	V	V	3V	This species has been recorded from the Currarong area in Jervis Bay, Royal National Park, Cronulla and Port Stephens (Gan Gan Hill, Nelson Bay). The Sydney and Royal NP populations have not been seen in recent times. Villous mint-bush is generally found on sandstone in sclerophyll forest and shrubland on coastal headlands. Plants flower throughout the year (DEC 2005u).	No.

Table 7 cont'd.

Species	Status			Habitat	Potential habitat
	EPBC Act ¹	TSC Act ²	ROTAP ³		
<i>Pterostylis gibbosa</i>	E	E1	2E	Known from a small number of populations in the Hunter region (Milbrodale), the Illawarra region (Albion Park and Yallah) and the Shoalhaven region (near Nowra). It is apparently extinct in western Sydney which is the area where it was first collected (1803). All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. In the Illawarra region, the species grows in woodland dominated by forest red gum <i>Eucalyptus tereticornis</i> , Wollybutt <i>E. longifolia</i> and white feather honey-myrtle <i>Melaleuca decora</i> . Near Nowra, the species grows in an open forest of spotted gum <i>Corymbia maculata</i> , forest red gum and grey ironbark <i>E. paniculata</i> . The Illawarra greenhood is a deciduous orchid that is only visible above the ground between late summer and spring, and only when soil moisture levels can sustain its growth (DEC 2005v).	Yes. Currumbene lowlands forest
<i>Pterostylis pulchella</i>	V	V	2V	The waterfall greenhood is found only at Fitzroy Falls, Belmore Falls, upper Bundanoon Creek (Meryla) and Minnamurra Falls (DEC 2005w). Usually favours creek banks and mossy rocks very close to running water (Bishop 1996). Flowers appear from February to May (DEC 2005w).	No
<i>Solanum celatum</i>	-	E1	-	Restricted to an area from Wollongong to just south of Nowra, and west to Bungonia. Majority of records are prior to 1960 and the majority of populations are likely to have been lost to clearing. Grows in rainforest clearings, or in wet sclerophyll forests. Flowers August to October and produces fruit December to January (DEC 2005x).	Yes. Illawarra gully wet forest, warm temperate layered forest and subtropical complex rainforest.
<i>Syzygium paniculatum</i>	V	V	3Ri	Subtropical and littoral rainforest on sandy soils or stabilised dunes near the sea (Harden 1991). Found only in NSW, in a narrow, linear coastal strip from Bulahdelah to Conjola State Forest. On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities (DEC 2005y).	Yes. Subtropical complex rainforest.

Table 7 cont'd.

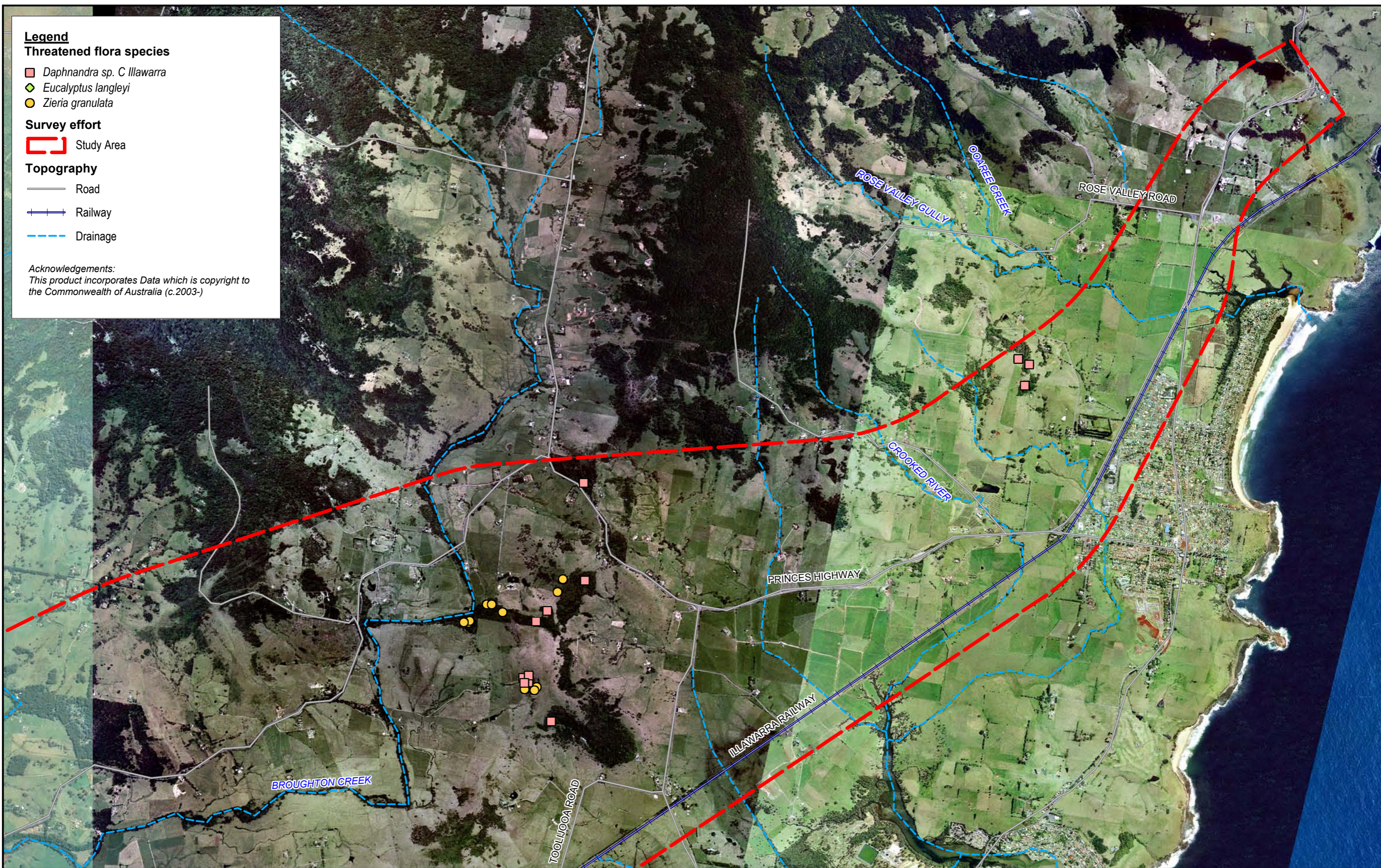
Species	Status			Habitat	Potential habitat
	EPBC Act ¹	TSC Act ²	ROTAP ³		
<i>Thesium australe</i>	V	V	3Vi	Clay soils in grassy woodlands or coastal headlands (James <i>et al.</i> 1999). Found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. Often found in damp sites in association with kangaroo grass (<i>Themeda australis</i>). A root parasite that takes water and some nutrient from other plants, especially kangaroo grass (DEC 2005z).	Yes. Illawarra gully wet forest and Currumbene lowlands forest
<i>Triplarina nowraensis</i>	E	E1	-	There are five known populations of Nowra Heath Myrtle. Three of these form a cluster to the immediate west of Nowra. A fourth, much smaller population is found 18 km south-west of Nowra in the Boolijong Creek Valley. The fifth population is located north of the Shoalhaven River on the plateau above Bundanon. Nowra Heath Myrtle occurs on poorly drained, gently sloping sandstone shelves or along creek lines underlain by Nowra sandstone. The sites are often either treeless or have a very open tree canopy due to the impeded drainage (DEC 2005j).	No. No treeless sites or sites with a very open tree canopy due to impeded drainage on Nowra sandstone in study area.
<i>Wilsonia backhousei</i>	-	V	-	In NSW, the species is found in the margins of coastal saltmarsh between Mimosa Rocks National Park on the south coast and Wamberal north of Sydney. Flowering occurs in spring and summer (DEC 2005~).	No. No coastal saltmarsh recorded in study area.
<i>Zieria baeuerlenii</i>	E	E1	2E	<p>The species occurs in only one location north-west of Nowra. The population occurs in a total of 43 colonies in six discrete clusters. These clusters are confined within a 0.5 km x 1.0 km area of the bushland, and are found on both sides of Bomaderry Creek. Bomaderry Zieria occurs on skeletal sandy loam overlaying sandstone, on a rocky plateau amongst sandstone boulders in either shrubby open forest, shrubby woodland or closed scrub (DEC 2005□).</p> <p>Only found in a small part of a 230 ha block of remnant native vegetation adjacent to the NSW South Coast towns of North Nowra and Bomaderry, known as the Bomaderry Bushland (NPWS 2002b).</p>	No. No rocky plateaus amongst sandstone boulders in study area and only known occurrence to south of study area.

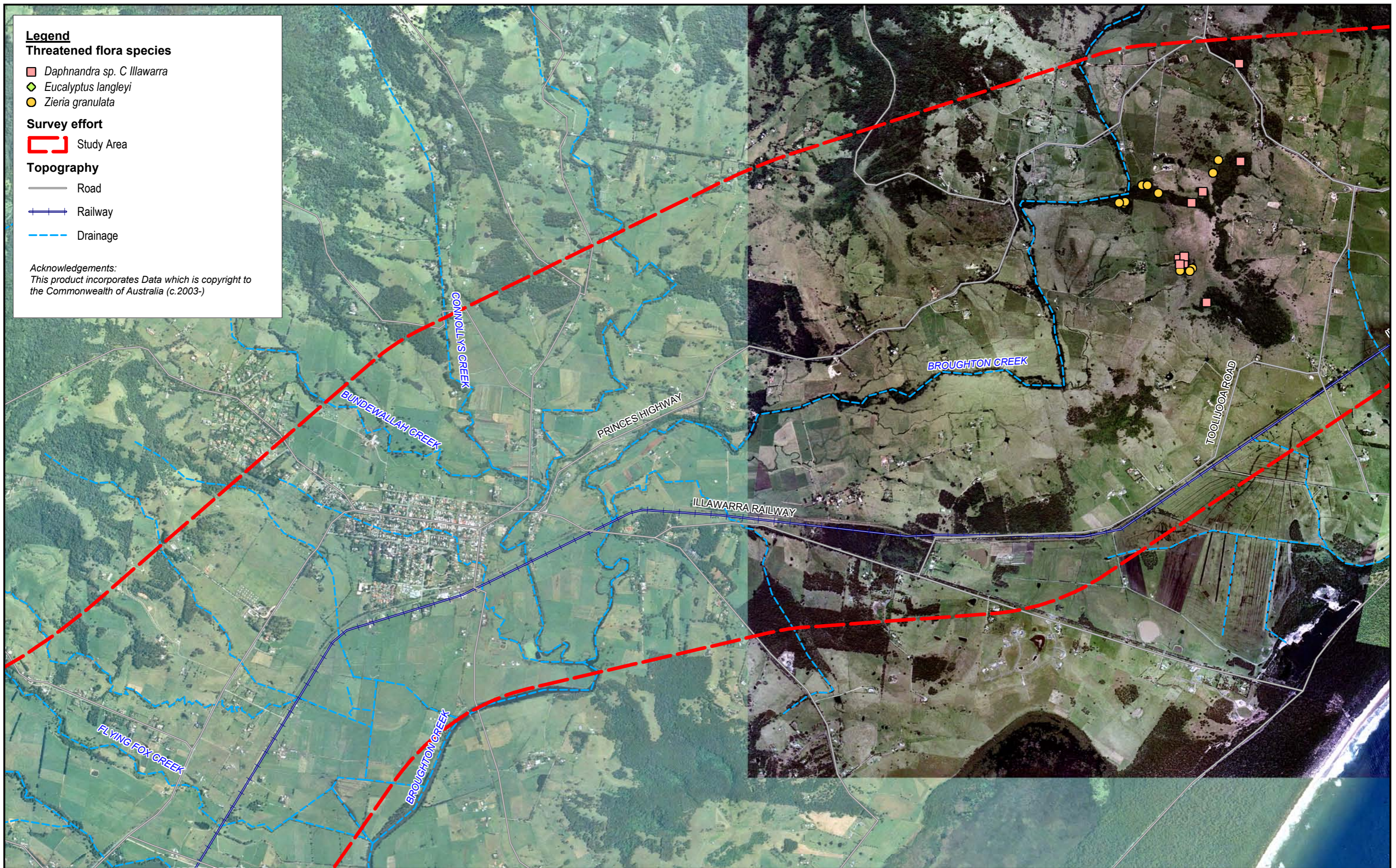
Table 7 cont'd.

Species	Status			Habitat	Potential habitat
	EPBC Act ¹	TSC Act ²	ROTAP ³		
<i>Zieria granulata</i>	E	E1	2Vi	Occurs in the Kiama district where it grows on dry rocky ridges in sclerophyll forest to rainforest margins (Harden 2002). The species primarily occupies the coastal lowlands between Oak Flats and Toolijooa, in the local government areas of Shellharbour and Kiama. The typical habitat is dry ridge tops and rocky outcrops on shallow volcanic soils. Less frequently found on the moist slopes of the Illawarra escarpment and in low-lying areas on Quaternary sediments. Associated vegetation includes bracelet honey-myrtle <i>Melaleuca armillaris</i> scrub, forest red gum <i>Eucalyptus tereticornis</i> woodland and rainforest margins, although the species has been recorded from a number of other vegetation types (DEC 2005€).	Yes. Recorded in study area in and adjoining areas of subtropical complex rainforest and warm temperate layered forest.

- Key: 1) Listed on the EPBC act as endangered (E) or vulnerable (V)
 2) Listed on the TSC act as endangered (E1), vulnerable (V) or endangered population (EP)
 3) Listed on ROTAP, using the following codes:
- **2** - Species with a geographic range of less than 100km in Australia
 - **3** - Species with a geographic range of more than 100km in Australia
 - **E** - Endangered species at risk of disappearing from the wild state if present land use and other causal factors continue to operate
 - **V** - Vulnerable species at risk of long-term disappearance through continued depletion.
 - **R** - Rare, but not currently considered to be endangered.
 - **C** - Known to be represented within a conserved area.
 - **a** - At least 1,000 plants are known to occur within a conservation reserve(s).
 - **i** - Less than 1,000 plants are known to occur within a conservation reserve(s).
 - - The reserved population size is unknown.

Three threatened flora species have been recorded in the study area: *Daphnandra* sp. 'Illawarra', *Eucalyptus langleyi* and *Zieria granulata* (**Figure 8a, b and c**). In addition, ten threatened plant species have potential habitat in the study area: *Acacia terminalis* ssp. *terminalis*, *Cryptostylis hunteriana*, *Cynanchum elegans*, *Galium australe*, *Irenepharsus trypherus*, *Pomaderris parrisiae*, *Pterostylis gibbosa*, *Solanum celatum*, *Syzygium paniculatum* and *Thesium australe*. These species are discussed in more detail below.





Legend

Threatened flora species

- *Daphnandra sp. C Illawarra*
- ◆ *Eucalyptus langleyi*
- *Zieria granulata*

Survey effort

- ▭ Study Area

Topography

- Road
- +— Railway
- - - Drainage

*Acknowledgements:
This product incorporates Data which is copyright to
the Commonwealth of Australia (c.2003-)*

Figure 8b: Threatened flora located within the Study Area.

DATE: 23 October 2007
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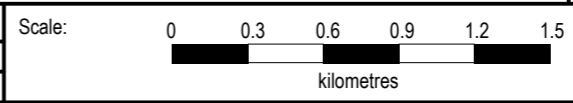
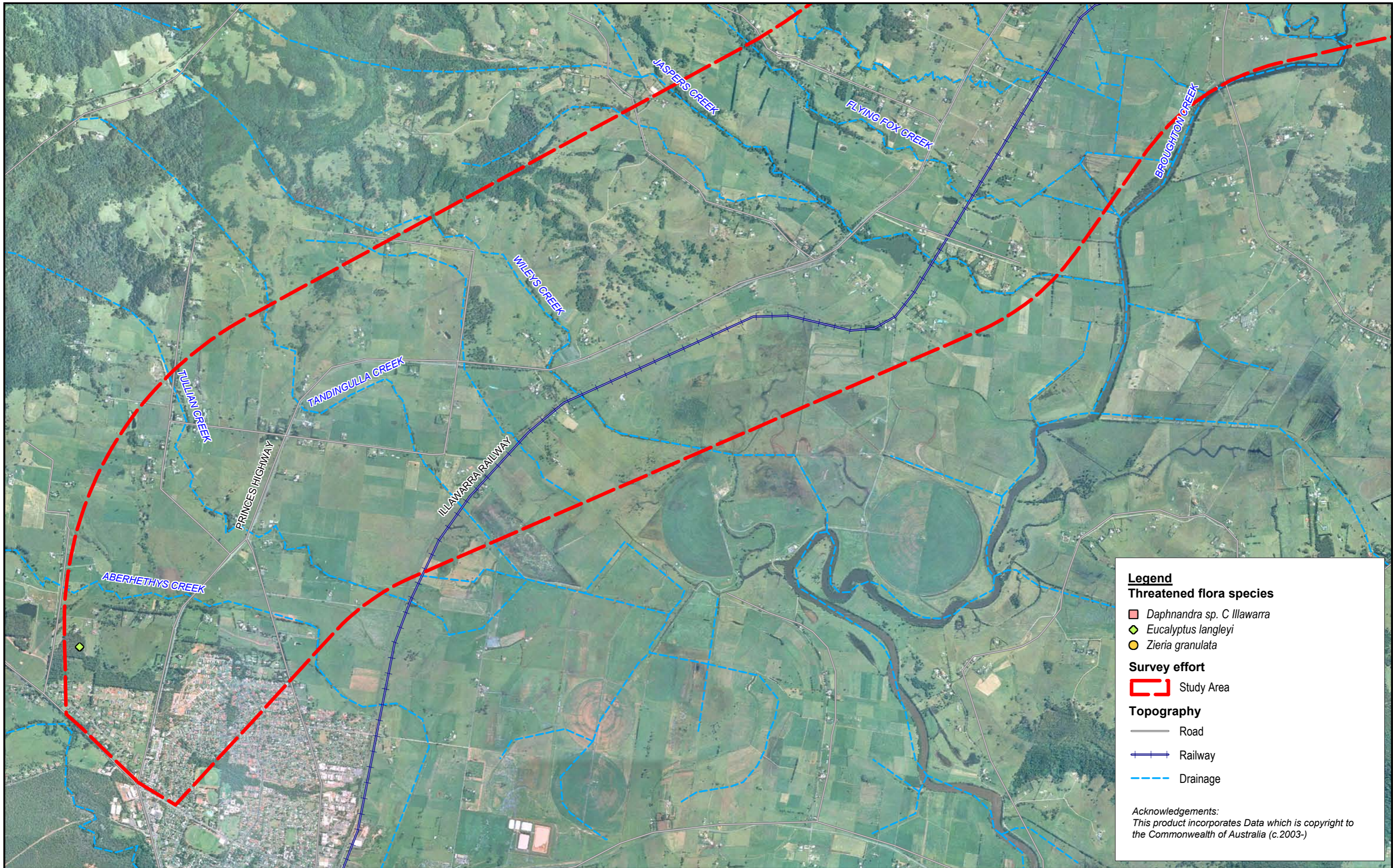


Figure 8b: Threatened flora located within the Study Area.

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 Chippendale
 NEW SOUTH WALES 2008





Legend

Threatened flora species

- Daphnandra* sp. C Illawarra
- Eucalyptus langleyi*
- Zieria granulata*

Survey effort

- Study Area

Topography

- Road
- Railway
- Drainage

Acknowledgements:
 This product incorporates Data which is copyright to the Commonwealth of Australia (c.2003-)

Acacia terminalis ssp. terminalis

Acacia terminalis ssp. *terminalis* is an erect or spreading shrub, one metre to five metres tall and with pale yellow flower heads and seed pods 3 cm to 11 cm long. This species differs from more widespread forms by being hairier, possessing thicker flower stalk and wider seed pods (DEC 2005b). This sub species has a limited distribution with records mainly near-coastal areas from the northern shores of Sydney Harbour and south to Botany Bay. Typical habitat includes coastal scrub and dry sclerophyll woodland on sandy soils (DEC 2005b).

According to the *Atlas of NSW Wildlife (Accessed Feb, 2007)*, a single recorded location of this species is known on the Shoalhaven River, near North Nowra, which is approximately four kilometres outside of the study area. Despite targeted searches, this species was not recorded during the current surveys.

Within the study area potential habitat for *Acacia terminalis* ssp. *terminalis* exists in Currumbene lowlands forest. This vegetation is located in the south of the study area, approximately four kilometres north-east of the known record of this species.

Cryptostylis hunteriana

Cryptostylis hunteriana is a leafless orchid species which produces upright flower stems between November and February. The species has a wide but sporadic distribution from Rainbow Beach in Queensland, inland to the Gibraltar Ranges in NSW and South to Orbost in Victoria (DEC 2005e). Recordings include a number of localities on the NSW South Coast and in recent years at many sites between Batemans Bay and Nowra (DEC 2005e). Populations of this species that may occur within the locality are not considered to be at the geographical limit of distribution for this species.

This species does not appear to have well defined habitat preferences and has been recorded from a range of plant communities, including swampy heaths and steep bare hillsides in tall eucalypt forest. Many locations appear to be on well drained sandy soils from both moist and dry habitats (*Bell 2001*). According to the DECC species profile (DEC 2005) larger populations typically occur in woodland dominated by *Eucalyptus sclerophylla*, *E. sieberi*, *Corymbia gummifera* and *Allocasuarina littoralis*. The species appears to prefer open areas in the understorey of these woodlands, often in association with *Cryptostylis subulata* and *Cryptostylis erecta* (DEC 2005h).

Cryptostylis hunteriana has not been previously recorded in the study area, however one record of the species exists approximately seven kilometres south of the study area within Shoalhaven State Forest. Within the study area potential habitat for this species is considered to exist in Currumbene lowlands forest. This vegetation is located in the south of the study area, approximately seven kilometres north of the known record of this species.

Cynanchum elegans

Cynanchum elegans is a climber or twiner with stems to one metre long. The peak flowering period for this species is thought to be summer (*Harden 1992*). The distribution of this species is restricted to eastern NSW where it is known from Brunswick Heads on the North Coast to Gerroa in the Illawarra region (DEC 2005f).

The species usually occurs on the edge of dry rainforest vegetation with associated vegetation types also including littoral rainforest (DEC 2005f). According to Harden (1992), *Cynanchum elegans* is known to occur in rainforest gullies scrub and scree slopes. *Cynanchum elegans* has been not been recorded in the study area (**Figure 8a, b and c**) however one recorded location is approximately two kilometres to the north-east of the study area, east of Foxgound.

Within the study area potential habitat for *Cynanchum elegans* exists in subtropical complex rainforest and warm temperate layered forest. These vegetation communities occur as scattered patches predominantly between Berry and Gerroa. Limited potential habitat is also considered to occur within Illawarra gully forest and Currumbene lowlands forest within the study area.

Daphnandra sp. C 'Illawarra'

Daphnandra sp. C 'Illawarra' is a medium sized rainforest tree growing to 20 m. The species is endemic to the Illawarra region of NSW where it is recorded from 41 sites in the local government areas of Wollongong, Shellharbour, Kiama and Shoalhaven (DEC 2005f). The main distribution of *Daphnandra* sp. C 'Illawarra' extends from Avondale in Wollongong LGA to Toolijooa in Kiama LGA, a distance of 27 km (DEC 2005f).

The species is known to occupy rocky hillsides and gully slopes of the Illawarra lowlands and occasionally extends onto the upper escarpment slopes. *Daphnandra* sp. "C" is known to occur within rainforest vegetation and less frequently on the margins and within disturbed areas to an altitude of 280 m (DEC 2005h) inhabiting sites with sheltered aspects or in locations conducive to the development of moist closed forest vegetation. *Daphnandra* sp. C 'Illawarra' sites are generally characterised by moderate to very steep slopes, with slope gradients ranging from 5 to 40° (DEC 2005f).

The species occurs mostly along gullies near creeks (*Harden 1990*), with minimum distance to the nearest ephemeral water course at surveyed sub-sites ranging from 0m to 110 m, although over 80% of these sub-sites are located at least partially within 30 m of the nearest watercourse (DEC 2005f).

Associated vegetation is dominated by dry rainforest aligned species although subtropical or warm temperate rainforest species are also present to varying degrees. Emergent eucalypts (including *E. quadrangulata* and *E. pilularis*) are present at sites that are located near the ecotone of rainforest and sclerophyll forest. An emergent *Casuarina cunninghamiana* was recorded at one site (DEC 2005f).

Daphnandra sp. C 'Illawarra' is known to be highly clonal, making it impossible to determine the number of genetic individuals present at a site without genetic analysis (DEC 2005h). From existing data regarding the number of stems present at a number of *Daphnandra* sp. C 'Illawarra' sites, it is assumed that the total population size of the species is small and it is likely that some sites contain just one individual (DEC 2005h). Because the species reproduces primarily by vegetative means, each site in the recovery plan is considered to contain a discrete population (DEC 2005h).

There are a number of recordings of this species in the local area, most of which occur to the north of the study area. There are known records within the study area, representing the southern most occurrence of the species. Known and potential habitat for this species in the study area includes subtropical complex rainforest and warm temperate layered forest.

Daphnandra sp. C 'Illawarra' was not recorded in the study area during the field surveys. Low stem numbers and the limited extend of occurrence of the species characterise many *Daphnandra* sp. C 'Illawarra' sites, consequently the search effort required to confirm the presence or absence of the species at a particular site is high (DEC 2005h). Time constraints were a limitation of the field survey, given the large study area. Therefore, previously recorded populations of *Daphnandra* sp. C 'Illawarra' are assumed to be presence despite being unable to confirm the species presence during the field surveys.

Three sites supporting *Daphnandra* sp. C 'Illawarra' were recorded by Muston & Associates (1991) (**Figure 8a, b and c**). No count numbers of the species are provided in the report, though the frequency of occurrence of the species is described as occasional at all three sites (reference to *Daphnandra micrantha* in **Sites 7 and 9** is assumed to be *Daphnandra* sp. C 'Illawarra').

The recovery plan for the species provides details of count numbers for many of the known *Daphnandra* sp. C 'Illawarra' populations within the study area. This information is detailed below.

Table 8 Details of count numbers for many of the known known *Daphnandra* sp. C 'Illawarra' populations within the study area

Location	Vegetation community	Data source	Comments	# stems
Toolijooa	Subtropical complex rainforest	DEC (2005h)	Not confirmed by DECC	-
Toolijooa	Warm temperate layered forest	Muston & Associates (1991), DEC (2005h)	Recorded by Muston & Associates (1991). Not confirmed by DECC	1
Toolijooa	Subtropical complex rainforest	Muston & Associates (1991), Goeth (2006), DEC (2005h) and NPWS Atlas of NSW Wildlife	Recorded by Muston & Associates (1991) in at least two locations. Confirmed by DECC (Goeth 2006)	10
Toolijooa	Warm temperate layered forest	Muston & Associates (1991) and DEC (2005h)	Recorded by Muston & Associates (1991), described as supporting a small population of young <i>Daphnandra</i> sp. C Illawarra. Not confirmed by C.	-
Alne Bank	Warm temperate layered forest	DEC (2005h)	Confirmed by DECC on 13/05/2004	237
Alne Bank	Subtropical complex rainforest	DEC(2005h)	Confirmed by DECC on 4/11/2004	55
Alne Bank	Subtropical complex rainforest	DEC (2005h)	Confirmed by DECC on 4/11/2004	94
Toolijooa	Subtropical complex rainforest	DEC (2005h)	Confirmed by DECC on 19/10/2004	3
Toolijooa	Subtropical complex rainforest	DEC (2005h)	Confirmed by DECC on 19/10/2004	92
-	Subtropical complex rainforest	Goeth (2006) and NPWS Atlas of NSW Wildlife	DECC Wildlife Atlas data, confirmed by DECC (Goeth 2006)	10
Estimated total				>502 stems

The populations of *Daphnandra* sp. C 'Illawarra' within the study area are considered to be highly significant, given that they are at the southern limit of the current known distribution of the species and support a relatively high number of stems of the species. The highest stem number in a population of the species in the local area is an estimate of over 1000 stems, occurring in a small patch of subtropical complex rainforest approximately one kilometre north of the study area, to the north-west of Gerringong.

Eucalyptus langleyi

Eucalyptus langleyi is described as a mallee that grows to six metres tall, with smooth, grey, green or pink bark that sheds in ribbons (DEC 2005i). The species main occurrence is to the south-west of Nowra as far as Yarramunmun Creek and has also been found to a limited extent north of the Shoalhaven River in the vicinity of Bomaderry Creek. The species is found in mallee shrubland on poorly-drained, shallow, sandy soils on sandstone (DEC 2005i).

Eucalyptus langleyi is known to occur in the local area, with records of the species occurring to the south-west of the study area. Within the Illawarra region, the species is restricted to the south of Kangaroo Valley and within the Jervis region, the species is restricted to the north of Conjola and west of the Princes Highway (DEC 2005i).

The species has been previously recorded in the study area in Currumbene lowlands forest (**Figure 8a, b and c**), which does not meet the habitat description for this species.

Galium australe

Galium australe is described as a straggling and inter-twining herb with weak, hairy stems to 60 cm long (DEC 2005k). *Galium australe* is known from the Towamba Valley near Bega, Lake Yarrunga near Kangaroo Valley, Cullendulla Creek Nature Reserve near Batemans Bay, Conjola National Park, Swan Lake near Swanhaven, and the Big Hole in Deua National Park. It was recorded historically from the Clyde River near Batemans Bay and the Mongarlowe area near Braidwood. The species also occurs beside Lake Windemere in the Australian Capital Territory at Jervis Bay (DEC 2005k).

Galium australe has been recorded from a range of habitats in NSW including a valley floor, alluvial soil beside a creek, heathland in a rocky gully, and the top of an escarpment above a creek (NSW Scientific Committee 2005). It has a patchy distribution, with low numbers of plants recorded at most locations and with the total number currently estimated to be less than 200 (NSW Scientific Committee 2005). The species has been found in moist gullies of tall forest, *Eucalyptus tereticornis* forest, coastal Banksia shrubland, and *Allocasuarina nana* heathland (NPWS 2005).

The species has not been previously recorded in the study area, nor within 10 km of the study area, however there is a record of the species approximately 18 km to the west of the study area. Within the study area, potential habitat for the species exists in warm temperate layered forest and Illawarra wet gully forest. These plant communities occur as scattered patches throughout the study area in varying condition.

Irenepharus trypherus

Irenepharus trypherus is described as a hairless annual or short-lived perennial herb that grows to 250cm (DEC 2005o). The species is known to occur on the coast and escarpment between Wollongong and the Shoalhaven River (Harden 1990) and typically inhabits steep rocky slopes near cliff lines and ridge tops. The species is also less typically found growing out of rock crevices or on narrow benches along cliff lines (DEC 2005o).

Irenepharus trypherus has been recorded from 18 sites within the local government areas of Kiama, Shellharbour, Shoalhaven, Tallaganda, Wingecarribee, and Wollongong. The species is found at such places as Minnamurra Falls, the Jamberoo area, and Morton and Macquarie Pass National Parks (DEC 2005o). The vast majority of sites are recorded from the upper slopes of the ridge systems that extend south and east of the Illawarra escarpment, although the species has also been recorded from the deep sandstone gorges of the Shoalhaven River. Associated vegetation includes moist sclerophyll forest, Ironwood *Backhousia myrtifolia* thicket, and rainforest (DEC 2005o).

Irenepharus trypherus has not been previously recorded in the study area, however there are five known sites supporting the species within the local area all occurring to the north-west of the study area on the upper slopes and ridges of the escarpment, with the closest records approximately 12 km from the study area. The known sites at the Illawarra occur to the west of the Pacific Highway and the known sites in the Moss Vale area are restricted to within five kilometres of the escarpment (DEC 2005o).

Within the study area potential habitat for *Irenepharus trypherus* exists in subtropical complex rainforest, Illawarra gully wet forest and warm temperate layered forest. These plant communities occur as scattered patches throughout the study area in varying condition.

Pomaderris parrisiae

Pomaderris parrisiae is described as a shrub or small tree to nine metres tall (DEC 2005r). The species has been recorded in Egan Peaks Nature Reserve, Wadbilliga National Park (near Wadbilliga Trig.) and South East Forests National Park (Brown Mountain / Cochrane Dam area), with a questionable record in Ben Boyd National Park. *Pomaderris parrisiae* is found on skeletal soils in rocky shrubland, tall open forest or rainforest, chiefly on escarpment ranges (DEC 2005r).

Pomaderris parrisiae has not been recorded in the study area, however there is one known record of the species 15 km to the north-west of the study area along a creekline on the upper escarpment slopes east of Fitzroy Falls.

Potential habitat for *Pomaderris parrisiae* occurs in the study area in subtropical complex rainforest, warm temperate layered forest and Illawarra gully wet forest. These plant communities occur as scattered patches throughout the study area in varying condition.

Pterostylis gibbosa

Pterostylis gibbosa is part of a large genus of ground-dwelling orchids with mostly green flowers. The species has a rosette of rounded leaves at the base of the stem, with up to six leaves that sheath the flower stem. *Pterostylis gibbosa* is a deciduous orchid that is only visible above the ground between late summer and spring, and only when soil moisture levels can sustain its growth (DEC 2005v).

Pterostylis gibbosa is known from a small number of populations in the Hunter region (Milbrodale), the Illawarra region (Albion Park and Yallah) and the Shoalhaven region (near Nowra). All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage.

The species was not recorded in the study area during the current surveys, however it should be noted that, given the cryptic nature of the species, targeted surveys should be undertaken in winter to spring when the species is leafy or in flower (DEC 2005v). The species has not been previously recorded in the study area, however there are a number of records of the species in the local area:

- a) Approximately six kilometres to the south of the study area near Nowra where the species grows in an open forest of *Corymbia maculata*, *Eucalyptus tereticornis* and *E. paniculata*; and
- b) A single record approximately 18 km to the north of the study area in the Illawarra region, where the species grows in woodland dominated by *Eucalyptus tereticornis*, *E. longifolia* and *Melaleuca decora*.

Potential habitat for *Pterostylis gibbosa* occurs in Currumbene Lowlands Forest in the study area. This plant community is dominated by *Corymbia maculata*, which is listed as a known associate species of the population in the Nowra area. Currumbene lowlands forest occurs in the southern section of the study area, south-west of Berry, in and around Bomaderry.

Solanum celatum

Solanum celatum is a shrub approximately one metre to 2.5 m high, with grey to white branches that are densely covered with hairs and sparsely armed with prickles (DEC 2005x). The species is restricted to an area from Wollongong to just south of Nowra, and west to Bungonia. The majority of known records are prior to 1960 and the majority of populations are likely to have been lost to clearing. The species grows in rainforest clearings, or in wet sclerophyll forests (DEC 2005x).

The species has not been recorded in the study area, however there are known records for the species in the local area, occurring approximately 18 km to the north of the study area along a creekline within the Illawarra region and approximately 15 km to the south of the study area. The closest record to the study area occurs approximately three kilometres to the north-west of Bomaderry on the lower escarpment slopes.

Potential habitat for *Solanum celatum* occurs in Illawarra gully wet forest, warm temperate layered forest and subtropical complex rainforest in the study area. These plant communities occur as scattered patches of vegetation in varying condition.

Habitat degradation, primarily by invasion of *Lantana camara* is listed as a threat to the species (DEC 2005x). *Lantana camara* is a dominant weed in many patches of native vegetation in the study area which are potential habitat for the species.

Syzygium paniculatum

Syzygium paniculatum is a small to medium sized rainforest tree that grows to eight metres tall (DEC 2005y). The species occurs in subtropical and littoral rainforest on sandy soils or stabilised dunes near the sea (Harden 1991) and is found only in NSW, in a narrow, linear coastal strip from Bulahdelah to Conjola State Forest. On the South Coast *Syzygium paniculatum* occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest (DEC 2005y). Within the Illawarra area, this species is known to be restricted to within 10 km of the coast (DEC 2005y).

The species has not been recorded in the study area, however there are two sites containing known records of the species in the local area. These records occur approximately seven kilometres and 18km to the south of the study area.

Potential habitat for the species occurs in subtropical complex rainforest in the study area. This plant community is restricted to hilly areas and escarpment slopes to the north-east of Berry.

Degradation of the species habitat through weed invasion, particularly *Lantana camara*, is listed as a threat to the species (DEC 2005y). *Lantana camara* is a dominant weed in many patches of native vegetation in the study area which are potential habitat for the species.

Thesium australe

Thesium australe is described as a small, straggling herb to 40 cm tall (DEC 2005z). The species is a root parasite that takes water and some nutrient from other plants, especially *Themeda australis* (DEC 2005z). It occurs on clay soils in grassy woodlands or coastal headlands (James *et al.* 1999) and is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. The species is often found in damp sites in association with *Themeda australis* (DEC 2005z).

The species has not been recorded in the study area, nor are there any previous records for the species in the local area. There are, however, known records for the species in the Southern Rivers region, the closest of which occurs in the Jervis sub-region, to the south of the study area.

Potential habitat for the species occurs in Illawarra gully wet forest and Currumbene lowlands forest within the study area. Currumbene lowlands forest occurs in the southern section of the study area, south-west of Berry, in and around Bomaderry and Illawarra gully wet forest as scattered patches throughout the study area.

Zieria granulata

Zieria granulata is described as a tall bushy shrub that grows to six metres (DEC 2005). The species primarily occupies the coastal lowlands between Oak Flats and Toolijooa, in the local government areas of Shellharbour and Kiama. The typical habitat is dry ridge tops and rocky outcrops on shallow volcanic soils. The species is also less frequently found on the moist slopes of the Illawarra escarpment and in low-lying areas on Quaternary sediments. Associated vegetation includes *Melaleuca armillaris* scrub, *Eucalyptus tereticornis* woodland and rainforest margins, although the species has been recorded from a number of other vegetation types (DEC 2005).

The majority of sites supporting *Zieria granulata* contain a very low number of plants, with only 13% of known sites supporting more than 300 plants (DEC 2005). Occurrences of this species in sizable populations are now extremely rare (Muston & Associates 1991).

Zieria granulata occurs in the local area, with numerous records occurring to the north of the study area and several records within the study area (Figure 8a, b and c). *Zieria granulata* was been recorded in study area in and adjoining areas of subtropical complex rainforest and warm temperate layered forest, associated with rocky outcrops. Assuming that a population can be defined as geographic discontinuity of more than one kilometre (following the definition used in the recovery plan for the species) (DEC 2005), the plants of *Zieria granulata* recorded in the study area, are part of the same population.

Table 9 Details of count numbers for many of the known *Zieria granulata* populations within the study area

Location	Vegetation community	Data source	Comments	# plants
West Broughton	Subtropical complex rainforest	DEC (2005)	Area not ground-truthed during field survey	40
Toolijooa	Warm temperate layered forest	DEC (2005)	Part of population confirmed during current surveys, supporting mature plants and juveniles.	1000
Toolijooa	Warm temperate layered forest	DEC (2005), Muston & Associates (1991)	Area not ground-truthed during field survey. Site recorded by Muston & Associates (1991), confirmed by DECC (Goeth 2006).	1000
Toolijooa	In rocky areas adjacent to subtropical complex rainforest	DEC (2005)	Population confirmed during current surveys, including mature plants and juveniles. Site confirmed by DEC (2005).	347
Toolijooa	In cleared area adjacent to warm temperate layered forest	Field survey	Two clumps of mature plants growing in cleared areas amongst dense <i>Pennisetum clandestinum</i> and <i>Lantana camara</i> . Site confirmed by DECC (Goeth 2006).	23
Estimated total				2410

Note: Data from *Zieria granulata* Recovery Plan (DEC 2005) using the lowest estimate of total plant numbers.

The total estimated population of *Zieria granulata* in the study area comes to at least 2410 plants. The population of *Zieria granulata* in the study area represents the southern-most occurrence of the species and occupies the rocky outcrops of Toolijooa ridge and the lower escarpment slopes. For these reasons, the population of *Zieria granulata* within the study area is considered to be highly significant and of extremely high conservation value.

Additional suites supporting *Zieria granulata* within two kilometres of the study area appear to support relatively few plants, with the maximum containing count information being 27 plants.

Where available, additional information regarding sites supporting *Zieria granulata* within the study area are described in detail below.

Site 40

Muston & Associates (1991) recorded *Zieria granulata* within the study area during surveys for the Gerringong to Berry Bypass (**Site 40**). The population was estimated to be in excess of 2000 plants and was described as containing two separate clumps: one containing scattered individuals of more than 1000 juvenile and mature plants ranging in height from 0.5 m to two metres tall; the other containing a dense stand of over 1000 mature plants greater than 2.5 m in height, likely to be an original, undisturbed stand (Muston & Associates 1991). The population also extended to the south, with smaller plants scattered in the cleared areas across an extensive rock exposure ((Muston & Associates 1991). Muston & Associates (1991) stated that the population of *Zieria granulata* recorded on Toolijooa ridge during surveys in 1991 “far exceeds any other recorded stand of the species, with other major stands in the region at Jerrara dam and Killalea State Recreation area containing only a couple of hundred, mostly regrowth plants”. The population described by Muston and Associates (1991) is part of the same population recorded in the study area during the current surveys.

A survey by Mitchell (1999) estimated that “several hundred plants” of *Zieria granulata* were recorded “rocky areas adjacent to the rainforest patches”. The presence of this stand of *Zieria granulata* was confirmed during the current survey. The stand was found to support mature plants and juveniles, which appeared to be recruiting despite competition from a dense layer of overgrown pasture grasses.

4.5 Fauna

A total of 158 animal species were recorded within the study area during the current survey. Native fauna comprised seven frog, nine reptile, 103 bird and 29 mammal species. Introduced species accounted for 6.3% (10) of the total number of animals recorded, which included six bird and three mammal species.

The fauna surveys generally focused on habitats with a greater potential to contain native species, e.g. remnant native forest/rainforest, wetlands (rivers, estuaries, soaks and farm dams) and rocky outcrops. Highly modified areas such as grazing paddocks and cropped pastures were routinely observed throughout the course of the field work.

4.5.1 Threatened animal species

67 threatened terrestrial animal species (previously recorded within 10 km of the study area on the DECC ‘Atlas of NSW Wildlife’) and eleven species of migratory bird (listed in the EPBC Act Protected Matters database search for the local area are included in this assessment¹. Five threatened animal species have been previously recorded within the study area:

- a) Eastern bent-wing bat;
- b) Greater broad-nosed bat;
- c) Black bittern;
- d) Square-tailed kite; and
- e) Yellow-bellied glider.

¹ Note: threatened marine and pelagic species also recorded within the 10 km search area were discounted from the assessment.

10 threatened species, including two from the list above, were recorded within the study area during the current surveys:

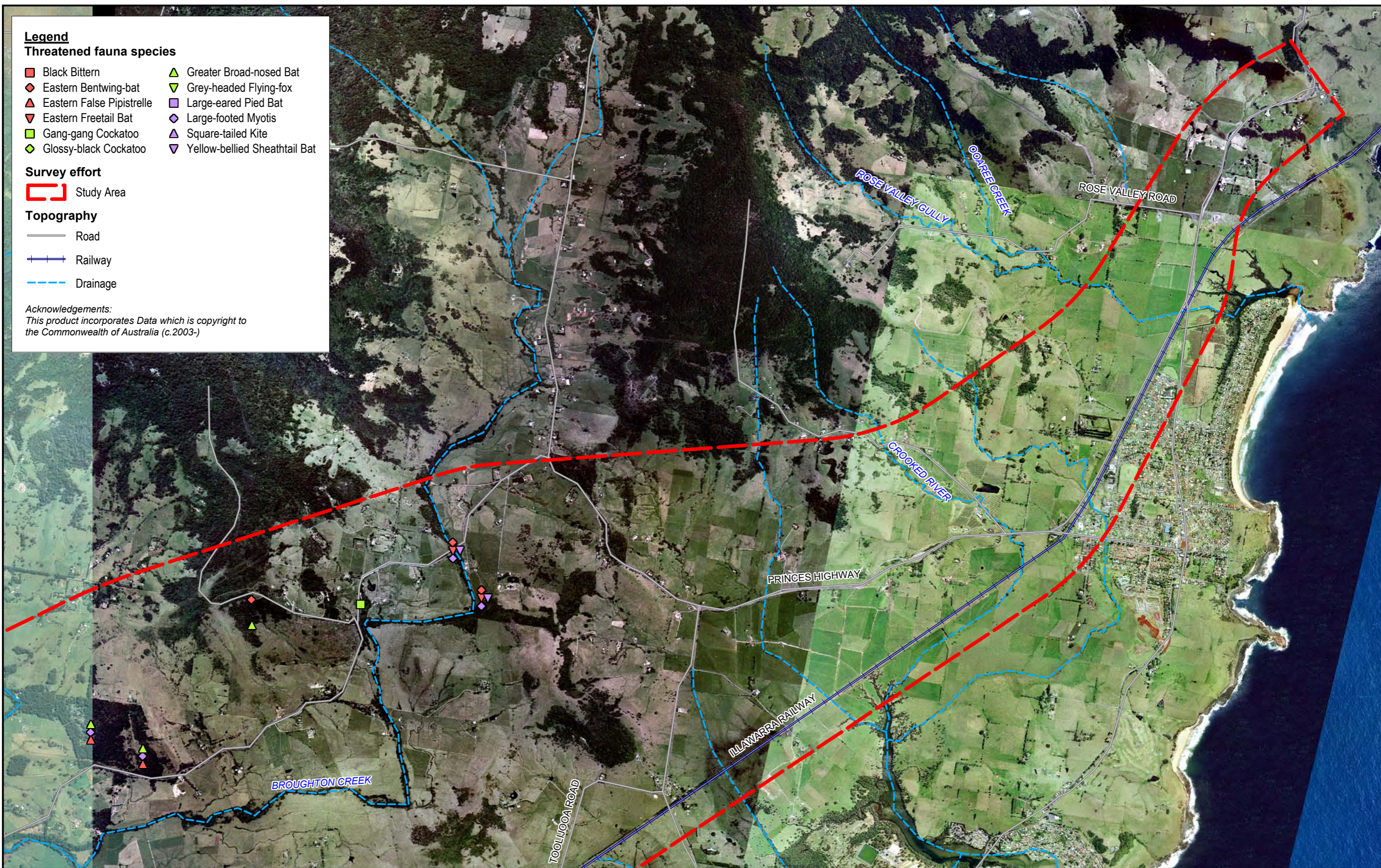
- f) Glossy black-cockatoo;
- g) Gang-gang cockatoo;
- h) Yellow-bellied sheathtail bat;
- i) Eastern freetail bat;
- j) Grey-headed flying fox;
- k) Large-eared pied bat;
- l) Eastern false pipistrelle;
- m) Eastern bent-wing bat;
- n) Large-footed myotis; and
- o) Greater broad-nosed bat.

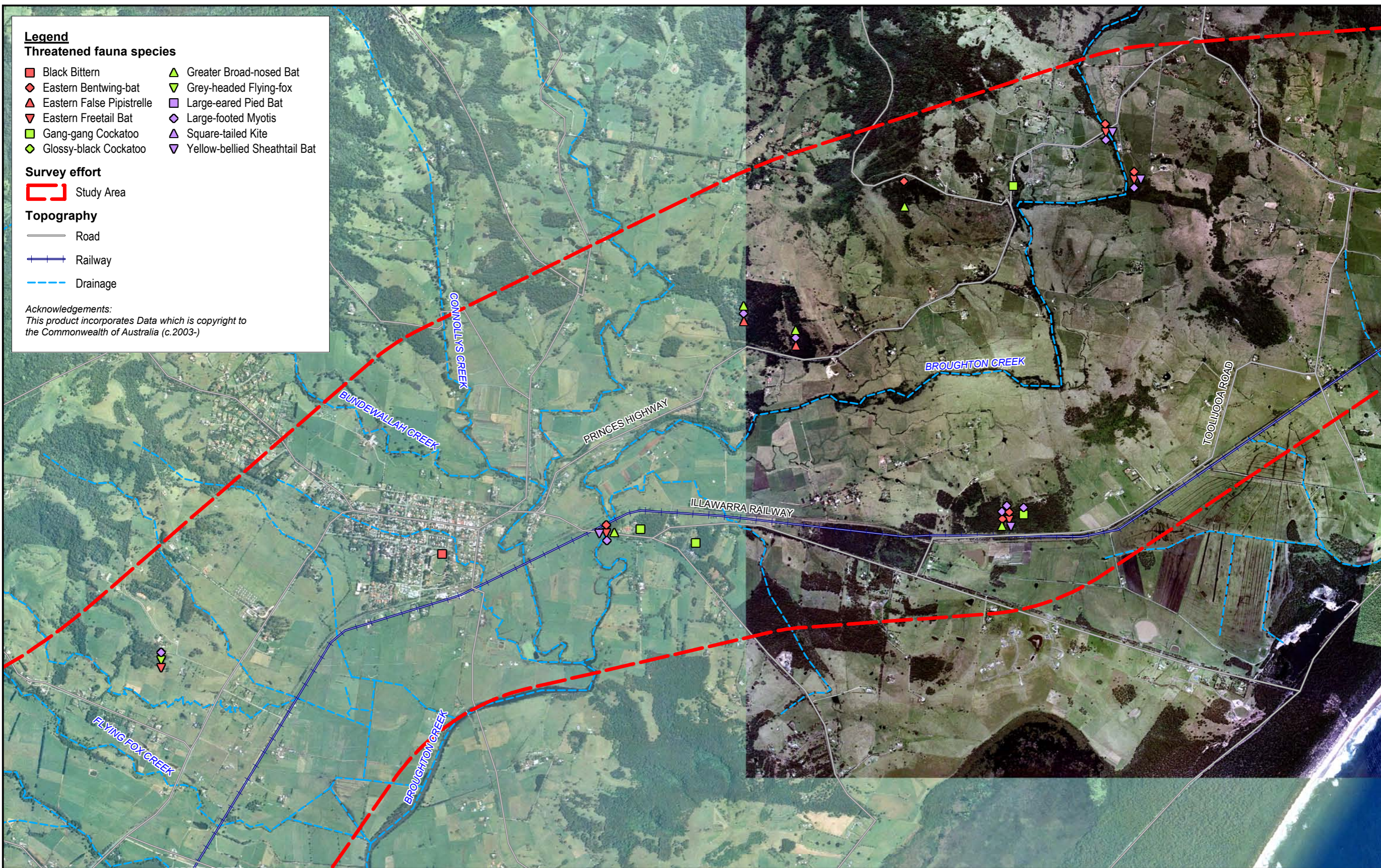
Locations of threatened species recorded on the databases and during the current survey are shown on **Figure 9a, b and c**.

All of the species listed above are highly mobile and have large home-ranges and would use the study area to obtain food and possibly shelter. While some populations would occur as permanent residents (e.g. yellow-bellied glider and square-tailed kite) others would move in and out of the study area in response to changes in food resources and season (e.g. eastern bent-wing bat and gang-gang cockatoo).

The occurrence of additional locally known threatened species (but undetected within the study area either previously or during the current survey) was based other criteria, including: the proximity of local / regional populations; species mobility and behaviours; wildlife corridors and the availability of suitable habitat within the study area.

Based on this criteria, 35 of the species (from **Table 10**) were considered unlikely to occur within the study area. The remaining 42 species were likely to occur, although variably, within the study area and are discussed in more detail below.





Legend

Threatened fauna species

- Black Bittern
- ◆ Eastern Bentwing-bat
- ▲ Eastern False Pipistrelle
- ▼ Eastern Freetail Bat
- Gang-gang Cockatoo
- ◆ Glossy-black Cockatoo
- ▲ Greater Broad-nosed Bat
- ▼ Grey-headed Flying-fox
- Large-eared Pied Bat
- ◆ Large-footed Myotis
- ▲ Square-tailed Kite
- ▼ Yellow-bellied Sheathtail Bat

Survey effort

- ▭ Study Area

Topography

- Road
- +— Railway
- - - Drainage

*Acknowledgements:
This product incorporates Data which is copyright to
the Commonwealth of Australia (c.2003-)*

Figure 9b: Threatened fauna located within the Study Area.

DATE: 23 October 2007
 Checked by: SEW File number: S4580
 Loc: ...4000\4500s\4580\Mapping - Phase 1 Constraints Assessment\report maps\S4580 F9_fauna B.WOR

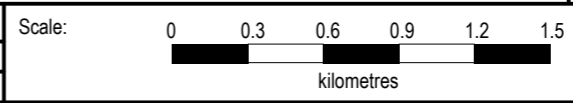
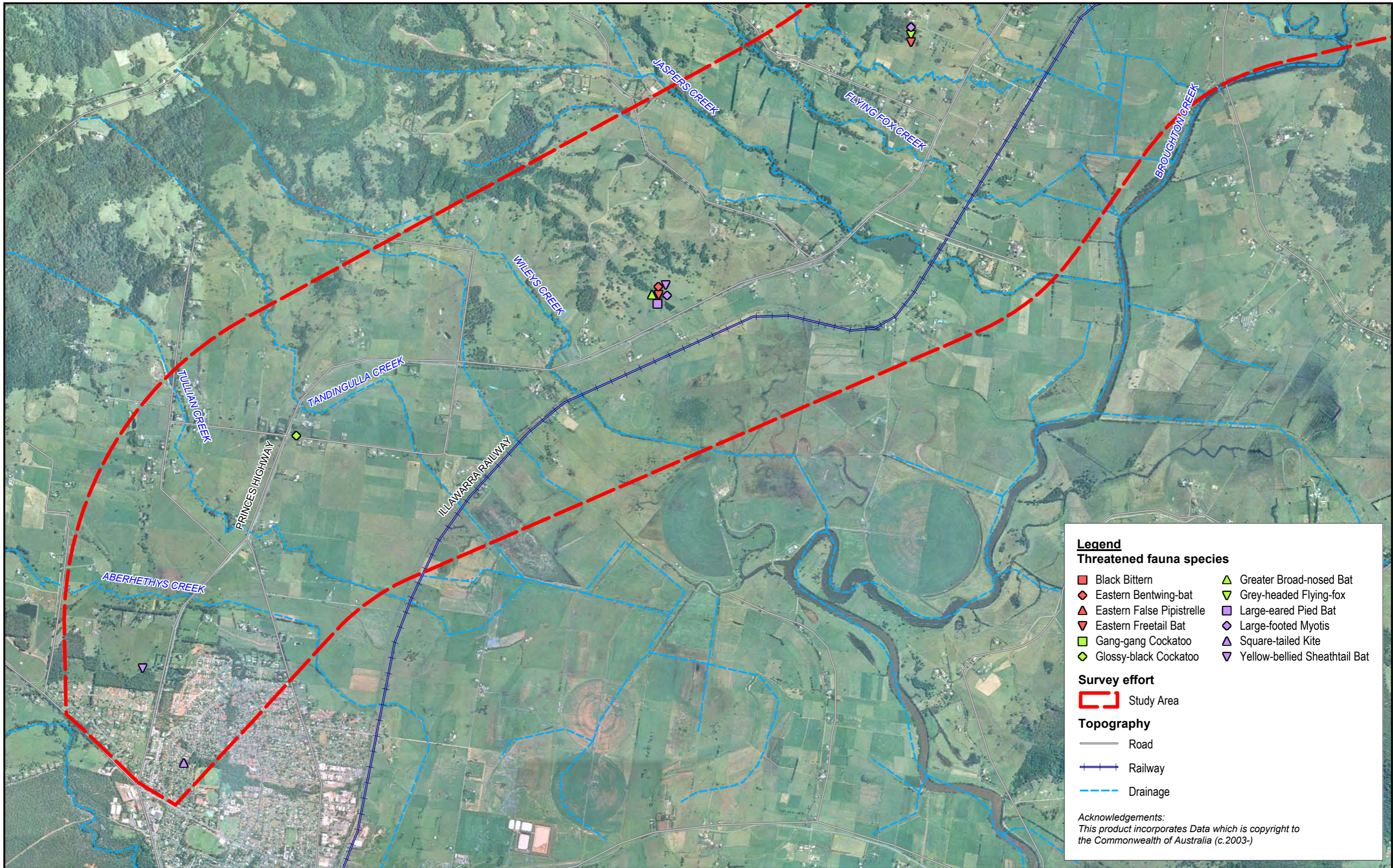


Figure 9b: Threatened fauna located within the Study Area.

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 Chippendale
 NEW SOUTH WALES 2008





Legend

Threatened fauna species

■ Black Bittern	▲ Greater Broad-nosed Bat
◆ Eastern Bentwing-bat	▼ Grey-headed Flying-fox
▲ Eastern False Pipistrelle	■ Large-eared Pied Bat
▼ Eastern Freetail Bat	◆ Large-footed Myotis
■ Gang-gang Cockatoo	▲ Square-tailed Kite
◆ Glossy-black Cockatoo	▼ Yellow-bellied Sheath-tail Bat

Survey effort

▭ Study Area

Topography

— Road

—+— Railway

- - - Drainage

Acknowledgements:
 This product incorporates Data which is copyright to the Commonwealth of Australia (c.2003-)

Figure 9c: Threatened fauna located within the Study Area.

DATE: 23 October 2007
 Checked by: SEW File number: S4580
 Loc: ...4000\4500s\4580\Mapping - Phase 1 Constraints Assessment\report maps\S4580 F9_fauna C.WOR

Scale: 0 0.3 0.6 0.9 1.2 1.5 kilometres

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Figure 9c: Threatened fauna located within the Study Area.

Table 10 Threatened species listed on the TSC Act and/or the EPBC Act (includes migratory species listed under the EPBC Act) that have been previously recorded or likely to occur in the local area (DECC Atlas of NSW Wildlife and DEWR EPBC online database).

Species shown in bold have are more likely to occur within the study area.

Family name	Latin name	Common name	EPBC Act	TSC Act	Habitat	Potential habitat within study area
Amphibians						
Hylidae	<i>Litoria aurea</i>	Green and golden bell frog	V	E1	Found in marshes, dams and stream sides, particularly those containing bullrushes or spikerushes (NPWS 1999e). Preferred habitat contains water bodies that are unshaded, are free of predatory fish, have a grassy area nearby and have diurnal sheltering sites nearby such as vegetation or rocks (White and Pyke 1996, NPWS 1999e).	Yes, but possibly limited opportunity. Known records e. of study area within Coomonderry and Foys swamps.
Hylidae	<i>Litoria littlejohni</i>	Littlejohn's tree frog	V	V	Occurs in wet and dry sclerophyll forests associated with sandstone outcrops between 280m and 1000m on the eastern slopes of the Great Dividing Range (Barker <i>et al.</i> 1995). Prefers rock flowing streams, but individuals have also been collected from semi-permanent dams with some emergent vegetation (Barker <i>et al.</i> 1995). Forages both in the tree canopy and on the ground, and has been observed sheltering under rocks on high exposed ridges during summer. It is not known from coastal habitats.	No. Previously recorded n-w. of study area. Not a coastal species.
Myobatrachidae	<i>Heleioporus australiacus</i>	Giant burrowing frog	V	V	Prefers hanging swamps on sandstone shelves adjacent to perennial non-flooding creeks (Daly 1996). Can also occur within shale outcrops within sandstone formations. In the southern part of its range can occur in wet and dry forests, montane sclerophyll woodland and montane riparian woodland (Daly 1996). Individuals can be found around sandy creek banks or foraging along ridge-tops during or directly after heavy rain. Males often call from burrows located in sandy banks next to water (Barker <i>et al.</i> 1995).	No, extremely limited at best. Previously recorded s. of study area.

Table 10 cont'd.

Family name	Latin name	Common name	EPBC Act	TSC Act	Habitat	Potential habitat within study area
Amphibians						
Myobatrachidae	<i>Mixophyes balbus</i>	Stuttering frog	V	E1	This species is usually associated with mountain streams, wet mountain forests and rainforests (Barker <i>et al.</i> 1995). It rarely wanders very far from the banks of permanent forest streams, although it will forage on nearby forest floors. Eggs are deposited in leaf litter on the banks of streams and are washed into the water during heavy rains (Barker <i>et al.</i> 1995).	No. Not previously recorded within 10 km of study area.
Myobatrachidae	<i>Pseudophryne australis</i>	Red-crowned toadlet	-	V	Occurs on wetter ridge tops and upper slopes of sandstone formations on which the predominant vegetation is dry open forests and heaths. This species typically breeds within small ephemeral creeks that feed into larger semi-perennial streams. These creeks are characterised after rain by a series of shallow pools lined by dense grasses, ferns and low shrubs (Thumm and Mahony 1996, Thumm and Mahoney 1997).	No.
Birds						
Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied sea-eagle	M	-	A migratory species that is resident to Australia. Found in terrestrial and coastal wetlands; favoring deep freshwater swamps, lakes and reservoirs; shallow coastal lagoons and saltmarshes (English and Predavec 2001).	Yes. Recorded during current survey. Previously recorded e. of study area
Accipitridae	<i>Lophoictinia isura</i>	Square-tailed kite	-	V	Typically inhabits coastal forested and wooded lands of tropical and temperate Australia (Marchant and Higgins 1993). In NSW it is often associated with ridge and gully forests dominated by Woollybutt <i>Eucalyptus longiflora</i> , Spotted Gum <i>Corymbia maculata</i> or Peppermint Gum <i>E. elata</i> , <i>E. smithii</i> (NPWS 1999h).	Yes. Previously recorded within study area and to s. of study area.
Accipitridae	<i>Pandion haliaetus</i>	Osprey	M	V	Found in coastal waters, inlets, estuaries and offshore islands. Occasionally found up larger rivers (Pizzey 1983).	Yes. Previously recorded e. of study area.

Table 10 cont'd.

Family name	Latin name	Common name	EPBC Act	TSC Act	Habitat	Potential habitat within study area
Birds						
Anatidae	<i>Oxyura australis</i>	Blue-billed duck	-	V	Almost wholly aquatic, preferring deep water in large, permanent wetlands with an abundant aquatic flora (Marchant and Higgins 1990).	Yes, but limited opportunity. Previously recorded e. and s-e of study area.
Anatidae	<i>Stictonetta naevosa</i>	Freckled duck	-	V	The freckled duck breeds in permanent fresh swamps that are heavily vegetated. Found in fresh or salty permanent open lakes, especially during drought. Often seen in groups on fallen trees and sand spits (Simpson and Day 1996).	Yes, but limited opportunity. Previously recorded s. of study area.
Apodidae	<i>Apus pacificus</i>	Fork-tailed swift	M	-	Almost exclusively aerial (Higgins 1999).	Yes. Recorded during current survey. Limited to mostly f/o.
Apodidae	<i>Hirundapus caudacutus</i>	White-throated needletail	M	-	An aerial species found in feeding concentrations over cities, hilltops and timbered ranges (Pizzey 1983).	Yes, f/o only.
Ardeidae	<i>Botaurus poiciloptilus</i>	Australasian bittern	-	V	Inhabits terrestrial and estuarine wetlands, generally where there is permanent water. Prefers wetlands with dense vegetation including rushes and reeds (NPWS 1999a).	Yes. Previously recorded n-e of study area, and in Coomonderry Swamp.
Ardeidae	<i>Ixobrychus flavicollis</i>	Black bittern	-	V	Usually found on coastal plains below 200m. Often found along timbered watercourses, in wetlands with fringing trees and shrub vegetation. The sites where they occur are characterized by dense waterside vegetation (NPWS 1999b).	Yes. Previously recorded on Broughton Creek e. of Berry
Burhinidae	<i>Burhinus grallarius</i>	Bush stone-curlew	-	E1	Lightly timbered open forest and woodland, or partly cleared farmland with remnants of woodland, with a ground cover of short sparse grass and few or no shrubs where fallen branches and leaf litter are present (Marchant and Higgins 1993).	Yes, but unlikely. Previously recorded n. and s. of study area.

Table 10 cont'd.

Family name	Latin name	Common name	EPBC Act	TSC Act	Habitat	Potential habitat within study area
Birds						
Burhinidae	<i>Esacus neglectus</i>	Beach stone-curlew	-	E1	Occurs on open, undisturbed beaches, islands, reefs and estuarine intertidal sand and mudflats (Marchant and Higgins 1993).	Yes, but unlikely. Previously recorded e. of study area
Cacatuidae	<i>Callocephalon fimbriatum</i>	Gang-gang cockatoo	-	V	In summer, occupies tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests (Higgins 1999). Also occur in subalpine snow gum woodland and occasionally in temperate or regenerating forest (Forshaw and Cooper 1981). In winter, occurs at lower altitudes in drier, more open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas (Shields and Crome 1992). It requires tree hollows in which to breed (Gibbons and Lindenmayer 1997).	Yes, recorded during current survey. Also previously recorded n-e and s-e of study area.
Cacatuidae	<i>Calyptorhynchus lathamii</i>	Glossy black-cockatoo	-	V	Inhabits forest with low nutrients, characteristically with key <i>Allocasuarina</i> species. Tends to prefer drier forest types (NPWS 1999c) with a middle stratum of <i>Allocasuarina</i> below eucalyptus or angophora. Often confined to remnant patches in hills and gullies (Higgins 1999). Breed in hollows stumps or limbs, either living or dead (Higgins 1999).	Yes. Recorded during current survey within small stand of tall spotted gum off Lamonds Lane. Also widely recorded to s-w, occasionally to s-e, e. and n-w of study area.
Charadriidae	<i>Charadrius leschenaultii</i>	Greater sand plover	M	V	Entirely coastal in NSW, foraging on intertidal sand and mudflats in estuaries and roosting during high tide on sandy beaches or rocky shores. Individuals have been recorded on inshore reefs, rock platforms, small rocky islands and sand cays on coral reefs, within Australia. Occasional sightings have also occurred on near-coast saltlakes, brackish swamps, shallow freshwater wetlands and grassed paddocks (NPWS 1999d).	No

Table 10 cont'd.

Family name	Latin name	Common name	EPBC Act	TSC Act	Habitat	Potential habitat within study area
Birds						
Charadriidae	<i>Charadrius mongolus</i>	Lesser sand plover	M	V	In Australia, the species is known to favour coastal environs including beaches, mudflats and mangroves. Within NSW, individuals have been observed on intertidal sand and mudflats in estuaries or roosting on sandy beaches or rocky shores at high tide (NPWS 1999f).	No
Charadriidae	<i>Pluvialis fulva</i>	Pacific golden plover	M	-	Migratory species that visits estuaries mudflats, saltmarshes and ocean shores as well as paddocks, grasslands and swamps near the coast (Pizzey 1994).	No
Charadriidae	<i>Thinornis rubricollis</i>	Hooded plover	-	E1	Prefers sandy ocean beaches, especially those that are broad and flat (Marchant and Higgins 1993).	No
Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	Black-necked stork	-	E1	Found in swamps, mangroves and mudflats. Can also occur in dry floodplains and irrigated lands and occasionally forages in open grassy woodland. Nests in live or dead trees usually near water (Pizzey 1983).	No
Columbidae	<i>Ptilinopus regina</i>	Rose-crowned fruit-dove	-	V	Occurs in tall tropical and subtropical, evergreen or semi-deciduous rainforest, especially with dense growth of vines. Prefers large patches of rainforest, but sometimes occurs in remnant patches surrounded by suboptimal habitat including farmlands (Higgins and Davies 1996).	Yes, but not previously recorded with 10 km study area
Dicruridae	<i>Monarcha melanopsis</i>	Black-faced monarch	M		A migratory species found during the breeding season in damp gullies in temperate rainforests. Disperses after breeding into more open woodland (Pizzey 1983).	Yes, recorded during current survey.
Dicruridae	<i>Myiagra cyanoleuca</i>	Satin flycatcher	M	-	Migratory species that occurs in coastal forests, woodlands and scrubs during migration. Breeds in heavily vegetated gullies (Pizzey 1983).	Yes

Table 10 cont'd.

Family name	Latin name	Common name	EPBC Act	TSC Act	Habitat	Potential habitat within study area
Birds						
Dicruridae	<i>Rhipidura rufifrons</i>	Rufous fantail	M	-	Migratory species that prefers dense, moist undergrowth of tropical rainforests and scrubs. During migration it can stray into gardens and more open areas (Pizzey 1983).	Yes, recorded during current survey.
Haematopodidae	<i>Haematopus fuliginosus</i>	Sooty oystercatcher	-	V	Found on undisturbed tidal rocks on ocean shores and islands. Occasionally found on sandspits and mudflats (Pizzey 1983).	No. Mostly restricted to the coastal area e. of the study area. Previously recorded to n-e and s-e of study area.
Haematopodidae	<i>Haematopus longirostris</i>	Pied oystercatcher	-	V	An intertidal forager found on undisturbed sandy beaches and spits, tidal mudflats and estuaries. Occasionally found in paddocks near the coast (Pizzey 1983).	No. Mostly restricted to the coastal area e. of the study area.
Jacanidae	<i>Irediparra gallinacea</i>	Comb-crested jacana	-	V	Occurs in freshwater wetlands, lagoons, billabongs, swamps, lakes, rivers and reservoirs, generally with abundant floating aquatic vegetation (Marchant and Higgins 1993).	Yes, but very limited opportunities. Not previously recorded within 10 km of study area. Nearest record north of Minnamurra.
Laridae	<i>Gygis alba</i>	White tern	-	V	Marine species found in tropical and subtropical oceans and islands (Pizzey 1994)	No. Not previously recorded within 10 km of study area.
Laridae	<i>Sterna albifrons</i>	Little tern	M	E1	Found in sheltered coastal environments including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets (Higgins and Davies 1996).	No. Previously recorded s-e of study area.
Laridae	<i>Sterna fuscata</i>	Sooty tern	-	V	Pelagic species of tropical waters. Offshore species rarely inshore unless forced by bad weather. Breeds on islands, coral cays and stacks (Higgins and Davies 1996)	No. Not previously recorded within 10 km of study area.
Meliphagidae	<i>Xanthomyza phrygia</i>	Regent honeyeater	E/M	E1	A semi-nomadic species occurring in temperate eucalypt woodlands and open forests. Most records are from box-ironbark eucalypt forests associations and wet lowland coastal forests (Pizzey 1983, NPWS 1999g).	Yes. Not widespread. Previously recorded s. and e. of the study area.

Table 10 cont'd.

Family name	Latin name	Common name	EPBC Act	TSC Act	Habitat	Potential habitat within study area
Birds						
Muscicapidae	<i>Acrocephalus stentoreus</i>	Clamorous reed-warbler	M	-	This species lives singly or in pairs usually in wetlands with reeds. It feeds on insects (Blakers <i>et al.</i> 1984).	Yes, recorded during current survey.
Pachycephalidae	<i>Pachycephala olivacea</i>	Olive whistler	-	V	Found in a range of habitats including alpine thickets, wetter rainforest/woodlands, riparian vegetation and heaths (Pizzey and Knight 1997).	Yes. Previously recorded s-e of the study area.
Pardalotidae	<i>Dasyornis brachypterus</i>	Eastern bristlebird	E	E1	Found in coastal woodlands, dense scrub and heathlands, particularly where it borders taller woodlands (Pizzey and Knight 1997).	No. Previously recorded in upland woodlands and heaths at Barren Grounds Nature Reserve n-e and Cambewarra Range e. of the study area.
Passeridae	<i>Stagonopleura guttata</i>	Diamond firetail	-	V	Found in a range of habitat types including open eucalypt forest, mallee and acacia scrubs (Pizzey and Knight 1997).	Yes, but limited. Not previously recorded within 10 km of study area.
Petroicidae	<i>Petroica rodinogaster</i>	Pink robin	-	V	Found in dense, dank forest/treefern gullies and disperses in autumn-winter to open forests, woodlands and scrublands (Pizzey and Knight 1997).	Yes, but study area is at the very limit of its northern range. There is just one record (in 1989) within study area.
Psittacidae	<i>Lathamus discolor</i>	Swift parrot	E	E1	The swift parrot occurs in woodlands and forests of NSW from May to August, where it feeds on eucalypt nectar, pollen and associated insects (Forshaw and Cooper 1981). The swift parrot is dependent on flowering resources across a wide range of habitats in its wintering grounds in NSW (Shields and Crome 1992). This species is migratory, breeding in Tasmania and also nomadic, moving about in response to changing food availability (Pizzey 1983).	Yes, but unlikely to occur frequently in the local area. Previously recorded at one location s-e of the study area.

Table 10 cont'd.

Family name	Latin name	Common name	EPBC Act	TSC Act	Habitat	Potential habitat within study area
Birds						
Psittacidae	<i>Neophema chrysogaster</i>	Orange-bellied parrot	CE/M	E1	Mostly found within 3km of the coast, mostly in sheltered coastal areas such as lagoon and estuaries (Higgins 1999). Migratory species which breeds in Tasmania during summer and departs for the s-e Australian mainland in autumn.	Yes, but unlikely to occur frequently in the local area. Previously recorded at one location to the s-e of the study area.
Psittacidae	<i>Neophema pulchella</i>	Turquoise parrot	-	V	Occurs in open woodlands and eucalypt forests with a ground cover of grasses and understorey of low shrubs (Morris 1980). Generally found in the foothills of the Great Divide, including steep rocky ridges and gullies (Higgins 1999). Nest in hollow-bearing trees, either dead or alive; also in hollows in tree stumps. Prefer to breed in open grassy forests and woodlands, and gullies which are moist (Higgins 1999).	Yes, but unlikely to occur frequently in the local area. Previously recorded at one location s. of study area.
Psittacidae	<i>Pezoporus wallicus wallicus</i>	Eastern ground parrot	-	V	Mainly found in heathland, sedgeland or buttongrass plains providing medium to dense cover (Higgins 1999).	Yes, but unlikely to occur frequently in the study area. Established populations known in upland locations n-e of the study area. Previously recorded at a just a few locations e. of the study area (probably dispersing juveniles).
Rostratulidae	<i>Rostratula australis</i>	Australian painted snipe	V/M	E1	Found in shallow swamps, dams, sewage farms and marshy areas, generally with a cover of grasses, lignum or open timber (Pizzey and Knight 1997).	Yes. Not previously recorded within 10 km of study area.
Scolopacidae	<i>Arenaria interpres</i>	Ruddy turnstone	M		Inhabits tidal reefs, sandy beaches mudflats and exposed or shallow seaweed beds (Pizzey 1994).	No

Table 10 cont'd.

Family name	Latin name	Common name	EPBC Act	TSC Act	Habitat	Potential habitat within study area
Birds						
Scolopacidae	<i>Calidris alba</i>	Sanderling	M	V	Occurs on the coast mostly on open sand beaches exposed to open sea-swells (Higgins and Davies 1996).	No. Previously recorded s-e of study area.
Scolopacidae	<i>Calidris tenuirostris</i>	Great knot	M	V	Mainly found on intertidal mudflats, sandflats and sandy beaches (Higgins and Davies 1996).	No. Previously recorded s-e of study area.
Scolopacidae	<i>Gallinago hardwickii</i>	Latham's snipe	M	-	Typically found on wet soft ground or shallow water with good cover of tussocks. Often found in wet paddocks, seepage areas below dams (Pizzey and Knight 1997).	Yes
Scolopacidae	<i>Limicola falcinellus</i>	Broad-billed sandpiper	M	V	Occurs in sheltered parts of coasts, such as estuaries, harbours, embayments and lagoons, which have shell or sandbanks nearby (Higgins and Davies 1996).	No. Previously recorded s-e of study area.
Scolopacidae	<i>Limosa limosa</i>	Black-tailed godwit	M	V	Mainly coastal, usually in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats (Higgins and Davies 1996).	No. Previously recorded s-e of study area.
Scolopacidae	<i>Numenius madagascariensis</i>	Eastern curlew	M	-	Occurs in sheltered coasts, especially estuaries, embayments, harbours, inlets and coastal lagoons with large intertidal mudflats or sandflats often with beds of seagrass (Higgins and Davies 1996).	No
Scolopacidae	<i>Xenus cinereus</i>	Terek sandpiper	M	V	Mainly found on saline intertidal mudflats in sheltered estuaries, embayments, harbours and lagoons (Higgins and Davies 1996).	No. Previously recorded s-e of study area.
Strigidae	<i>Ninox connivens</i>	Barking owl	-	V	Generally found in open forests, woodlands, swamp woodlands and dense scrub. Can also be found in the foothills and timber along watercourses in otherwise open country (Pizzey 1983).	Yes. Previously recorded e. & s-e of study area.

Table 10 cont'd.

Family name	Latin name	Common name	EPBC Act	TSC Act	Habitat	Potential habitat within study area
Birds						
Strigidae	<i>Ninox strenua</i>	Powerful owl	-	V	Occupies wet and dry eucalypt forests and rainforests. Can occupy both un-logged and lightly logged forests as well as undisturbed forests where it usually roosts on the limbs of dense trees in gully areas. It is most commonly recorded within red turpentine in tall open forests and black she-oak within open forests (Debus and Chafer 1994). Large mature trees with hollows at least 0.5m deep are required for nesting (Garnett 1992). Tree hollows are particularly important for the powerful owl because a large proportion of the diet is made up of hollow-dependent arboreal marsupials (Gibbons and Lindenmayer 1997). Nest trees for this species are usually emergent with a diameter at breast height of at least 100 cm (Gibbons and Lindenmayer 1997).	Yes. Previously recorded n-e, s. & e. of study area.
Tytonidae	<i>Tyto novaehollandiae</i>	Masked owl	-	V	Inhabits a diverse range of wooded habitat that provide tall or dense mature trees with hollows suitable for nesting and roosting (Higgins 1999). Mostly recorded in open forest and woodlands adjacent to cleared lands. Nest in hollows, in trunks and in near vertical spouts or large trees, usually living but sometime dead (Higgins 1999). Nest hollows are usually located within dense forests or woodlands (Gibbons and Lindenmayer 1997). Masked owls do prey upon hollow-dependent arboreal marsupials, but terrestrial mammals make up the largest proportion of the diet (Gibbons and Lindenmayer 1997, Higgins 1999).	Yes. Previously recorded e., s. & s-e of study area.

Table 10 cont'd.

Family name	Latin name	Common name	EPBC Act	TSC Act	Habitat	Potential habitat within study area
Birds						
Tytonidae	<i>Tyto tenebricosa</i>	Sooty owl	-	V	Often found in tall old-growth forests, including temperate and subtropical rainforests. In NSW mostly found on escarpments with a mean altitude <500m. Nests and roosts in hollows of tall emergent trees, mainly eucalypts (Higgins 1999) often located in gullies (Gibbons and Lindenmayer 1997). Nests have been located in trees 125 to 161 centimeters in diameter (Gibbons and Lindenmayer 1997).	Yes. Previously recorded n-e & s-e of study area
Mammals						
Burramyidae	<i>Cercartetus nanus</i>	Eastern pygmy-possum	-	V	Inhabits rainforest through to sclerophyll forest and tree heath. Banksias and myrtaceous shrubs and trees are a favoured food source. Will often nest in tree hollows, but can also construct its own nest (Turner and Ward 1995). Because of its small size it is able to utilise a range of hollow sizes including very small hollows (Gibbons and Lindenmayer 1997). Individuals will use a number of different hollows and an individual has been recorded using up to 9 nest sites within a 0.5ha area over a 5 month period (Ward 1990).	Yes, but unlikely to occur. Previously recorded n-e of study area.
Dasyuridae	<i>Dasyurus maculatus</i>	Spotted-tailed quoll	E	V	Uses a range of habitats including sclerophyll forests and woodlands, coastal heathlands and rainforests (Dickman and Read 1992). Habitat requirements include suitable den sites, including hollow logs, rock crevices and caves, an abundance of food and an area of intact vegetation in which to forage (Edgar and Belcher 1995).	Yes. Widely recorded to the w. and less frequently to the e. of the study area. Anecdotal reports within the study area.

Table 10 cont'd.

Family name	Latin name	Common name	EPBC Act	TSC Act	Habitat	Potential habitat within study area
Mammals						
Dasyuridae	<i>Dasyurus viverrinus</i>	Eastern quoll	-	E1	This species occurs in a variety of habitats including scrub, heathland, cultivated land and dry sclerophyll forest (Strahan 1995; NPWS 1999). Den sites can consist of a number of chambers in range of structure from underground burrows, hollow logs, rock piles and hay sheds. The eastern quoll is a solitary feeder with males often travelling over a kilometer in a night to forage (Strahan 1995). Females restrict their movements to a few hundred meters around their dens. This species feeds on agricultural pest, insect and large animals including ground-nesting birds and small mammals (NPWS 1999).	No. Considered extinct on the mainland
Dasyuridae	<i>Sminthopsis leucopus</i>	White-footed dunnart	-	V	The white-footed dunnart is found in a range of different habitats across its distribution, including coastal dune vegetation, coastal forest, tussock grassland and sedgeland, heathland, woodland and forest. They shelter in bark nests in hollows under standing or fallen timber, burrows in the ground, piles of logging debris, large grass clumps such as provided by grass trees <i>Xanthorrhoea</i> sp., <i>Macrozamia</i> and rock crevices (DEC 2005).	Yes, but very limited within the study area. Previously recorded from one location s-w of study area.
Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied sheath-tail bat	-	V	Reported from a wide range of habitats throughout eastern and northern Australia, including wet and dry sclerophyll forest, open woodland, acacia shrubland, mallee, grasslands and desert (Churchill 1998). They roost in tree hollows and have also been observed roosting in animal burrows, abandoned sugar glider nests, cracks in dry clay, hanging from buildings and under slabs of rock (Churchill 1998). The species flies high and fast and forages above the canopy (Churchill 1998).	Yes, recorded during current survey.

Table 10 cont'd.

Family name	Latin name	Common name	EPBC Act	TSC Act	Habitat	Potential habitat within study area
Mammals						
Macropodidae	<i>Macropus parma</i>	Parma wallaby	-	V	Occurs in wet and dry sclerophyll forest with a thick, shrubby understorey associated with grassy patches. They may also occur in rainforest but prefer the wet sclerophyll forest (Strahan 1995). This species feed on grasses and herbs (Strahan 1995).	Yes, but extremely limited chance of occurring. Previously recorded from one location in 1886 s-w of study area.
Macropodidae	<i>Petrogale penicillata</i>	Brush-tailed rock-wallaby	V	E1	Found in rocky areas in a wide variety of habitats including rainforest gullies, wet and dry sclerophyll forest, open woodland and rocky outcrops in semi-arid country. Commonly sites have a northerly aspect with numerous ledges, caves and crevices (Eldridge and Close 1995).	No. Previously recorded s-e of study area.
Molossidae	<i>Mormopterus norfolkensis</i>	Eastern freetail bat	-	V	Most records are from dry eucalypt forests and woodlands to the east of the Great Dividing Range. Appears to roost in trees, but little is known of this species habits (Allison and Hoyer 1995, Churchill 1998).	Yes, recorded during current survey.
Peramelidae	<i>Isoodon obesulus</i>	Southern brown bandicoot	E	E1	Prefers sandy soils with scrubby vegetation and/or areas with low ground cover that are burn from time to time (Braithwaite 1995). A mosaic of post fire vegetation is important for this species (Maxwell <i>et al.</i> 1996).	Yes, but limited. Previously recorded n-e of study area.
Petauridae	<i>Petaurus australis</i>	Yellow-bellied glider	-	V	Restricted to tall native forests in regions of high rainfall. Preferred habitats are productive, tall open sclerophyll forests where mature trees provide shelter and nesting hollows. Critical elements of habitat include sap-site trees, winter flowering eucalypts, mature trees suitable for den sites and a mosaic of different forest types (NPWS 1999i).	Yes, but limited. Previously recorded s-w. edge of study area.

Table 10 cont'd.

Family name	Latin name	Common name	EPBC Act	TSC Act	Habitat	Potential habitat within study area
Mammals						
Petauridae	<i>Petaurus norfolcensis</i>	Squirrel glider	-	V	Generally occurs in dry sclerophyll forests and woodlands but is absent from dense coastal ranges in the southern part of its range (Suckling 1995). Requires abundant hollow bearing trees and a mix of eucalypts, banksias and acacias (Quin 1995). There is only limited information available on den tree use by squirrel gliders, but it has been observed using both living and dead trees as well as hollow stumps (Gibbons and Lindenmayer 1997). Within a suitable vegetation community at least one species should flower heavily in winter and one species of eucalypt should be smooth barked (Menkhorst <i>et al.</i> 1988).	Yes, but limited. Not previously recorded within 10 km study area.
Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala	-	V	Inhabits eucalypt forests and woodlands. The suitability of these forests for habitation depends on the size and species of trees present, soil nutrients, climate and rainfall (Reed and Lunney 1990, Reed <i>et al.</i> 1990).	Yes, but limited. Previously recorded e. and s-w of the study area. Apart for e. record in 2005 all other are more than 50 years old. Likelihood of occurrence is considered low.
Potoroidae	<i>Potorous tridactylus</i>	Long-nosed potoroo	V	V	Inhabits coastal heath and wet and dry sclerophyll forests. Generally found in areas with rainfall greater than 760 mm. Requires relatively thick ground cover where the soil is light and sandy (Johnston 1995).	Yes, but limited within the study area. Most previous records are w. of the study area and occasionally to the e. of the study area.

Table 10 cont'd.

Family name	Latin name	Common name	EPBC Act	TSC Act	Habitat	Potential habitat within study area
Mammals						
Pteropodidae	<i>Pteropus poliocephalus</i>	Grey-headed flying-fox	V	V	This species is a canopy-feeding frugivore and nectarivore of rainforests, open forests, woodlands, Melaleuca swamps and Banksia woodlands. Bats commute daily to foraging areas, usually within 15 km of the day roost (Tidemann 1995) although some individuals may travel up to 70 km (Augee and Ford 1999).	Yes, recorded during current survey and numerous anecdotal reports across study area. Known camp site within Coomoderry Swamp to the east of the study area
Vespertilionidae	<i>Chalinolobus dwyeri</i>	Large-eared pied bat	V	V	Located in a variety of drier habitats, including the dry sclerophyll forests and woodlands to the east and west of the Great Dividing Range (Hoye and Dwyer 1995). Can also be found on the edges of rainforests and in wet sclerophyll forests (Churchill 1998). This species roosts in caves and mines in groups of between 3 and 37 individuals (Churchill 1998).	Yes, recorded during current survey.
Vespertilionidae	<i>Falsistrellus tasmaniensis</i>	Eastern false pipistrelle	-	V	Inhabit sclerophyll forests, preferring wet habitats where trees are more than 20m high (Churchill 1998). Two observations have been made of roosts in stem holes of living eucalypts (Phillips 1995). There is debate about whether or not this species moves to lower altitudes during winter, or whether they remain sedentary but enter torpor (Menkhorst and Lumsden 1995). This species also appears to be highly mobile and records showing movements of up to 12 km between roosting and foraging sites (Menkhorst and Lumsden 1995).	Yes, recorded during current survey.

Table 10 cont'd.

Family name	Latin name	Common name	EPBC Act	TSC Act	Habitat	Potential habitat within study area
Mammals						
Vespertilionidae	<i>Miniopterus schreibersii oceanensis</i>	Eastern bent-wing bat	-	V	Uses a broad range of habitats including rainforests, wet and dry sclerophyll forests, open woodlands and open grasslands (Churchill 1998). Roosts in caves, but can also use manmade structures such as mines and road culverts (Dwyer 1995, Churchill 1998). Specific caves are used as nursery caves, containing a large number of individuals, which can be used year after year (Dwyer 1995, Churchill 1998).	Yes, recorded during current survey.
Vespertilionidae	<i>Myotis adversus</i>	Large-footed myotis	-	V	Occurs in most habitat types as long as they are near permanent water bodies, including streams, lakes and reservoirs. Commonly roost in caves, but can also roost in tree hollows, under bridges and in mines (Richards 1995, Churchill 1998).	Yes, recorded during current survey.
Vespertilionidae	<i>Scoteanax rueppellii</i>	Greater broad-nosed bat	-	V	Prefer moist gullies in mature coastal forests and rainforests, between the Great Dividing Range and the coast. They are only found at low altitudes below 500m (Churchill 1998). In dense environments they utilise natural and human-made opening in the forest for flight paths. Creeks and small rivers are favoured foraging habitat (Hoye and Richards 1995). This species roosts in hollow tree trunks and branches (Churchill 1998).	Yes, recorded during current survey.

Family name	Latin name	Common name	EPBC Act	TSC Act	Habitat	Potential habitat within study area
Reptiles						
Elapidae	<i>Hoplocephalus bungaroides</i>	Broad-headed Snake	V	E1	Mainly occurs in association with communities occurring on Triassic sandstone within the Sydney Basin. Typically found among exposed sandstone outcrops with vegetation types ranging from woodland to heath. Within these habitats they generally use rock crevices and exfoliating rock during the cooler months and tree hollows during summer .	No. Previously recorded s-w of study area.
Varanidae	<i>Varanus rosenbergi</i>	Rosenberg's Goanna	-	V	This species is a Hawkesbury/Narrabeen sandstone outcrop specialist (Wellington and Wells 1985). Occurs in coastal heaths, humid woodlands and both wet and dry sclerophyll forests (Cogger 1992).	No

Key: V= Vulnerable, E1 = Endangered, CE = Critically Endangered, M = Migratory

Amphibians

The green and golden bell frog is the only threatened frog species that could occur within the study area. It was not recorded during the current surveys, however, the conditions were not optimal for observing this species. A population of green and golden bell frog is known to occur within Coomonderry and Foy's swamps to the east of the study area and could provide a source point for any dispersing animals. While the population is likely to be restricted to these swamps there will be occasions when dispersal behaviours (i.e. in response to during heavy summer rainfall) may result in individuals moving into surrounding areas, including the eastern extremes of the study area.

Raptors

Two species of threatened raptor have been previously recorded within the local area - square-tailed kite and osprey. The former species seems to be restricted to the southern extremes of the study area, whereas the latter species is mostly known from the coastal fringe to the east, but also from the Crooked River Estuary) and the Shoalhaven River to the south.

Wetland / water birds

Blue-billed duck

The blue-billed duck was not observed during the current surveys although the species has been previously recorded east and south-east of the study area. Although its preferred habitat - large deep lakes and ponds - is limited within the study area the species could occasionally use larger farm dams, e.g. Agars Lane, between Beach Road and Toolijooa Road and a farm dam on Jaspers Creek.

Freckled duck

The freckled duck was not observed during the current surveys although the species has been previously recorded south of the study area. Although its preferred habitat, large well vegetated waterbodies, is limited within the study area the species could use larger farm dams within the study area, most notably the farm dam at Agars Lane.

Australasian bittern and black bittern

Neither the Australasian bittern or black bittern were observed during the current surveys. The Australasian bittern has been recorded within Coomonderry Swamp and the black bittern within the study area, near Broughton Creek east of Berry. Both species of bittern appear to have a wide distribution but they occur in just a few locations and sightings are rare. Neither species are ever recorded in large numbers which is probably due to their secretive behaviour and crepuscular (dusk) activity.

Australian painted snipe

The Australian painted snipe was not observed during the current surveys nor have they been previously recorded within the local area. However, the lack of local record is not necessarily surprising as the species is quite secretive and can be easily overlooked.

Grassland / shrub land / heath

Eastern ground parrot and orange-bellied parrot

The eastern ground parrot is mainly found in heathland, sedgeland or buttongrass plains. When on the mainland the orange-bellied parrot has similar habitat requirements, which also include saltmarsh, littoral heath and low shrub lands. Both species may occasionally occur in non-native habitats, including exotic grasslands and pasture. Both species would have a low frequency of occurrence within the study area.

The eastern ground parrot has established populations at Barren Ground to the north-west and occasionally dispersing juveniles would occur within the local area and possibly the study area. It is unlikely, however, that new populations would become established within the poorer habitats of the study area.

While the orange-bellied parrot could occur its population is in such critically low numbers (only 200 mature adults occur in the wild) that any local occurrence would be considered a very rare event.

Woodland / forest birds

Diamond firetail, swift parrot, turquoise parrot and regent honeyeater barking owl, powerful owl, masked owl, gang-gang cockatoo and glossy black-cockatoo

Woodland habitats are not a dominant feature of the study area, however, past vegetation clearing, patchy regrowth and plantings have resulted some areas that may have structural similarity to woodland habitats. Forest habitats were more prevalent but were not extensive within the study area, occurring more as isolated remnants, partial wildlife links or edge components of otherwise more extensive forest to the west of the study area.

There are few local records of diamond firetail, swift parrot, turquoise parrot and regent honeyeater and due to their low numbers and the limited resources within the study area the chance of occurrence is considered to be low.

No species of threatened forest owl were recorded during the current surveys, however, the barking, powerful and masked owls have been recorded in close proximity to the study area and usually in association with existing forest habitats, to the east and west of the study area, which are likely to provide an array of potential prey species (e.g. arboreal and ground-dwelling mammals) and possibly large hollow-bearing trees for nesting. Large hollow-bearing trees were generally uncommon in forest patches within the study area and it is considered unlikely, though not impossible, that nesting would occur within the study area. A variety of preferred prey species (e.g. possums, rodents and reptiles) were observed within forest remnants and could provide suitable foraging opportunities for these predatory birds.

Both the gang-gang cockatoo and glossy black-cockatoo were recorded during the current surveys and both species have been previously recorded in forest habitats near the study area. Both species require large tree hollows for nesting, which, as for the owl species, were limited. The glossy black-cockatoo was observed in small stand of spotted gum forest off Lamonds Lane in the southern part of the study area, could provide nesting hollows for this species. Generally, food resource for the glossy black-cockatoo (seed cones of *Allocasuarina* spp.) were not abundant within the study area.

Wet forest / rainforest birds

Sooty owl

The sooty owl is more likely to occur in wet forest habitats associated with the Cambewarra Range, west of the study area but may occasionally occur within rainforest remnants within the study area.

Rose-crowned fruit-dove and olive whistler

Provided the proposed road corridor avoids excessive clearing of rainforest remnants and riparian forests, particularly in the west of the study area and Broughton Creek, then the impact on these species, and their habitats, is likely to be low.

Arboreal mammals

Yellow-bellied glider and squirrel glider

The yellow-bellied glider was not recorded during the current surveys. The species has been previously recorded within Cambewarra Range Nature Reserve on the western margin of the study area off Strongs Road. The squirrel glider was not recorded during the current surveys nor has it been recorded within 10 km of the study area. The only known record occurs Near Red Rocks Nature Reserve in the Kangaroo Valley.

Provided the proposed road corridor avoids forested areas along the lower eastern slopes of the Cambewarra Range then the impact on these species, and their habitat, is likely to be low.

Terrestrial mammals

Long-nosed potoroo, spotted-tailed quoll and southern brown bandicoot

Neither the long-nosed potoroo, spotted-tailed quoll and southern brown bandicoot were recorded during the current survey. Previous observations of these species have occurred within the foothills and lower sloped of the Cambewarra Range, west of the study area. The spotted-tailed quoll has been previously recorded over a considerably wide part of the local area, and there are number of anecdotal sightings by landowners within the study area.

Provided that the proposed road corridor avoids forested areas to the west and adequate underpasses are included in the design then the impact on these species, and their habitats, is likely to be low. The need for future targeted surveys will be further considered once the preferred route has been selected.

Flying mammals - bats

Yellow-bellied sheathtail bat, eastern freetail bat, large-eared pied bat, eastern false pipistrelle, eastern bent-wing bat, large-footed myotis and greater broad-nosed bat

Seven threatened microbat species were recorded during the current surveys (see **Table 7**). Two of these species, eastern bent-wing bat and the large-eared pied bat, are obligate cave-dwellers and are unlikely to have roosting habitat within the study area. The remaining species can use a range of roost sites including tree hollows, culverts and abandoned buildings and could, therefore, roost with such structures with the study area. All species, however, appear to foraging within or on the edges of forest remnants and along riparian forests.

Grey-headed flying-fox

The grey-headed flying-fox is widely distributed within the local area and there is also a known camp site at Coomonderry Swamp to the east.

Provided the proposed road corridor avoids excessive clearing of forested areas, particularly along riparian and preferred feed trees (e.g. figs and banksias) then the impact on this species, and their habitat, is likely to be low.

4.5.2 Listed migratory species

White-bellied sea-eagle

A single individual was observed soaring over the central parts of the study area during the current surveys. Local pairs are likely to forage over waterways within the study area including Broughton Creek, Crooked River estuary and larger farm dams stocked with fish. It is likely to be a member of a local nesting pair or family.

Osprey

Refer to discussion above (**Section Error! Reference source not found.**, page 84, Raptors).

Fork-tailed swift

Recorded during the current surveys flying over **Site 6**.

White-throated needletail

Not recorded during the current surveys but likely to occur high above hilltops and ridgelines of the study area. The proposed action would have negligible effect on this species.

Black-faced monarch

Recorded during the current surveys within numerous forest patches.

Satin flycatcher

Not recorded during the current surveys but likely to occur within forest habitats and adjacent grasslands.

Rufous fantail

Recorded during the current surveys within rainforests and occasionally in riparian forests.

Clamorous reed-warbler

Recorded in various wetlands (e.g. drainage lines and farm dams) and occasionally in adjacent pasture crops.

Latham's snipe

Not recorded during the survey but likely to occur within dense reedlands, wet grassland and riparian forests within the study area.

4.6 Endangered populations

Part 2 of Schedule 1 of the TSC Act lists endangered populations of flora and fauna. There are no endangered fauna or flora populations listed that occur within the study area.

One endangered population has been listed to the north of the study area; the plant species *Chorizema parviflorum* in the Wollongong and Shellharbour local government areas. The closest known location of this species to the study area occurs approximately 18 km to the north. The species grows in heath and sclerophyll woodland and forest on heavy soils (*Harden 2002*). All known sites (excluding the site at Austinmer) occupy woodland or forest dominated by *Eucalyptus tereticornis* and/or *E. longifolia* (DEC 2005). It appears unlikely that potential habitat for the species occurs within the study area, given that the known associate species were not recorded.

4.7 Critical habitat

Critical habitat can be declared under both the EPBC and TSC Acts. Under the EPBC Act, it is an offence for a person to take an action that the person knows will significantly damage the critical habitat of a listed threatened species. Under the TSC Act, the declaration of critical habitat serves primarily as a guide for planning under Part 3 of the EP&A Act and a trigger which ensures a rigorous environmental assessment of all activities and development proposals and any other action that has the potential to damage the species or its habitat (NPWS 2002b).

No areas of critical habitat for flora or fauna have been declared within the study area under either the EPBC or TSC Act.

One area of critical habitat for the plant species *Zieria baeuerlenii* may be declared under the TSC Act, within the Bomaderry bushland (to the south of the study area). The species is only found in a small part of this 230 ha remnant of native vegetation (NPWS 2002b). A total of 54 ha of the 230 ha remnant has been recommended for listing as critical habitat, which incorporates the six separate sub-catchments that the discrete groups of *Zieria baeuerlenii* occur within. Sub-catchment boundaries were defined by creek and ridgelines and were selected to encompass all lands upslope of each cluster of *Zieria baeuerlenii* colonies (NPWS 2002b). The declaration has yet to be finalised.

4.8 Corridors

The major habitat corridors within the Illawarra region occur to the south, west and north of the study area and incorporate a number of national parks, nature reserves and state forests. To the west of the study area, Morton National Park provides a wildlife corridor from Fitzroy Falls in the north to the Budawang National Park west of Ulladulla in the south. North of the study area, land managed by the Sydney Catchment Authority provides a wildlife corridor from the Southern Highlands to the Royal National Park.

These two main wildlife corridors are separated along the Illawarra Highway. However, habitat linkages between the two corridors occur via Budderoo National Park, Macquarie Pass National Park, Barren Grounds Nature Reserve and the Cambewarra Range Nature Reserve. The Illawarra Regional Environmental Plan No. 1 identifies a regional wildlife corridor linking Saddleback Mountain and Barren Grounds Nature Reserve (south-west of Kiama) with Morton National Park. This regional wildlife corridor extends along the western side of the study area and incorporates well vegetated land in the foothills of the escarpment in the areas of Foxground and Broughton Village.

With the exception of the regional wildlife corridor along the western side of the study area, habitat corridors within the study area itself are disjunct and extremely limited. However, the potential for a corridor between Seven Mile Beach National Park and Barren Grounds Nature Reserve has previously been identified (RVMC 2005). Such a corridor would be of significance, in that it would link coastal vegetation, including EEC, with the escarpment. The main regional corridors described above provide a far more extensive habitat corridor from the north to the south of the Illawarra region; however, the vast majority of the land within these corridors occurs either on the escarpment or along the eastern edge of the escarpment. Existing east-west corridors linking coastal areas with the escarpment and corridors that incorporate the native vegetation of the coastal floodplain are considerably less extensive.

It is important to note that at present, the Seven Mile Beach – Barren Grounds “corridor” comprises disjunct patches of vegetation that occur along Toolijooa ridge, Harley Hill and Moeyan Hill and a thin strip of vegetation along Broughton Creek. None of these vegetation patches are completely linked and some are separated by several hundred metres of grazed, cleared paddocks. Most of the vegetation is regrowth that occurs on privately owned lands and some of the vegetation is considerably weed infested. Providing a fully functioning wildlife corridor in this area would require a resumption of grazing land, intensive revegetation, ongoing management and the long-term commitment of a number of land owners.

The potential corridor vegetation along Broughton Creek and Toolijooa ridge are defined as “Areas of High Conservation Value” by the *Kiama Municipal Council Local Environment Plan*.

Vegetation along creeks and some road reserves within the study area would also provide limited value as local corridors for some species. Riparian vegetation along Broughton Creek is likely to form a local linkage between more extensive vegetation to the north-west and south-west. Although the surrounding vegetation matrix consists primarily of cleared lands for agriculture and the quality of riparian vegetation along the southern sections of the creek is relatively poor (and narrow), the creek still provides a level of connectivity. Currently the existing Princes Highway and the south coast railway form potential barriers in the corridor, although both have bridges over the creek. The south coast railway is not considered a major fauna barrier due to the infrequency of rail traffic.

It should also be noted that vegetation within roadside reserves is often an important element within a regional corridor network (Bennett 1991, Forman et al. 2003). Animals can use road reserves as habitat in which to live as well as movement corridors facilitating local movements, dispersal and migration (Bennett 1990). Within highly modified landscapes, remnant patches and strips of vegetation within road reserves are often the only remaining vegetation links. A number of studies have indicated the importance of such roadside vegetation (Middleton 1980, Newbey and Newbey 1987). Within the study area native roadside vegetation was limited to discontinuous segments of native and exotic tree cover and groundcover within matrix of introduced grasses and weeds. With the exceptions of Beach and Toolijooa Roads and Agars Lane, most of the road side vegetation within the study area was limited and unconnected and provided limited value for native wildlife.

The main corridor linkages within the study area are:

- a) Forest remnants extending from the escarpment into lower foothills along the western margin of the study area. These forest components are not part of a corridor across the study area; however, they are the edges of a major regional corridor to the west of the study area and are likely to provide habitat for a wide assemblage of native species. These include the yellow-bellied glider, olive whistler, sooty owl, spotted-tailed quoll, long-nosed potaroo and grey-headed flying fox.
- b) A potential corridor comprising patches of distinct or partially linked vegetation along Toolijooa Ridge and Harley Hill (including **Sites 1, 17, 18, 19, 20, 21, and 26**). This is linked to some extent with vegetation along Broughton Creek.
- c) Broughton Creek flows from north to south and enters the study area near Foxground, passing east of Berry and enters the Shoalhaven River between Bolong and Black Forest. This is the only functional, although fragmented, north-south corridor within the study area. The vegetation comprises Illawarra gully forest on the lower slopes to the north and floodplain swamp forest and coastal sand swamp forest on the flatter lowlands.
- d) Beach Road provides a narrow roadside corridor between Broughton Creek, east of Berry, and Seven Mile Beach National Park, east of the study area.

These habitat corridors are likely to influence the movement and distribution of some species at the local scale, particularly species that have restricted habitat components (e.g. rainforest) within and surrounding the study area. Existing connections between habitat patches that occur on either sides and within the study area should be maintained, thereby retaining the limited amount of available habitat for resident species and preserving ecological functions.

A range of different animal species will exist within the study area and use the existing corridor network. These species would cover all taxonomic groups including frogs (e.g. bleating tree frog *Litoria dentata*, eastern dwarf tree frog *Litoria fallax*), reptiles (e.g. diamond python *Morelia spilota spilota*, eastern water dragon *Physignathus lesueurii*, eastern water skink *Eulamprus quoyii*), birds (including a wide variety of species with various habitat preferences, ranging from grassland / pasture and forest generalist e.g. Richard's pipit *Anthus novaeseelandiae*, black-faced cuckoo-shrike *Coracina novaehollandiae* to the more specialised rainforest species e.g. topnot pigeon *Lopholaimus antarcticus* and Rufous fantail *Rhipidura rufifrons*), and mammals (e.g. eastern grey kangaroo *Macropus giganteus*, swamp wallaby *Macropus robustus*, brown antechinus *Antechinus stuartii*, bush rat *Rattus fuscipes* and arboreal mammals including possums and gliders). Threatened species that may use the corridor network include the spotted-tailed quoll, gang-gang cockatoo, clossy black-cockatoo and a range of microbat species. How species use the corridor network will depend largely on the home and activity range of the species, their habitat requirements and the ecological characteristics of the corridor. For example, some large or mobile species may make direct movements through the corridor network, moving from one patch of habitat to another. These direct movements may be on the scale of a foraging expedition or a migration (Bennett 1990). Other species may have movements by single individuals punctuated by pauses in the corridor, which can last anything from a small foraging or resting bout to weeks and even months.

If the corridor contains sufficient resources to maintain a population, then continuity through the corridor may be through gene flow through the resident population (*Bennett 1990, Wilson and Lindenmayer 1995*).

Roads can generally cause a significant barrier to the movement of animals within a wildlife corridor network (*Andrews 1990, Bennett 1991, Cuperus et al. 1999*). Although not necessarily totally stopping all movements of animals, a road without mitigation measures may reduce the number of successful movements through a corridor by acting as a deterrent (*Barnett et al. 1978, Bennett 1991*) or by increasing mortality as they move through the corridor (*Van der Zande et al. 1980, Andrews 1990, Forman et al. 2003*). Road widening may increase the effectiveness of the barrier in hindering fauna movements and the options phase of this development may be seen as an opportunity to increase or maintain connectivity through mitigation measures such as fauna underpasses and/or revegetation.

5.0 Constraints and opportunities

5.1 Constraints mapping

5.1.1 Criteria

Criteria used to rank land within the study area in terms of relative conservation significance included information regarding the type of plant community present (particularly whether EEC were present), threatened species known or likely to be present, the condition and importance of the flora and fauna habitats present and corridor values. Using a combination of these criteria, flora and fauna habitats in the study area were grouped into five categories: very high, high, moderate, low and very low. The criteria used to define each category are presented below and a map of relative conservation significance across the study area is presented in **Figure 10a, b and c**.

5.1.2 Very high

Areas that have been set aside for international, national or state conservation purposes were deemed to have very high conservation significance. These included world heritage areas, national parks or state conservation areas. Other sections of the study area deemed to be of very high conservation significance were locations that contained at least two of the following attributes:

- a) Relatively large areas of an EEC or other plant community of state or national significance;
- b) Large numbers and/or high diversity of threatened species, or threatened species that are particularly significant for some other reason (for example, species listed as critically endangered nationally or species at the edge of their known range);
- c) Critical habitat for threatened species; and
- d) Good connectivity with large areas of native vegetation and/or high corridor values.

There are no world heritage areas, national parks or state conservation areas within the study area. Other locations deemed to be of very high conservation significance were generally limited to higher elevation situations along the western periphery of the study area, where the native vegetation was an extension of a much larger area to the west and contained EEC and/or records of threatened species.

Another area deemed to be of very high conservation significance occurred on the western side of Toolijooa Ridge, sloping down to Broughton Creek. Although largely regrowth and containing a high proportion of weed species, a relatively contiguous band of native vegetation in this area contained patches of the EEC Illawarra subtropical rainforest and populations of two threatened plant species, *Zieria granulata* and *Daphnandra* sp. C 'Illawarra, that are regarded as highly significant.

Legend
Conservation significance

- Very High
- High
- Medium
- Low

Survey effort

- Study Area

Topography

- Road
- Railway
- Drainage

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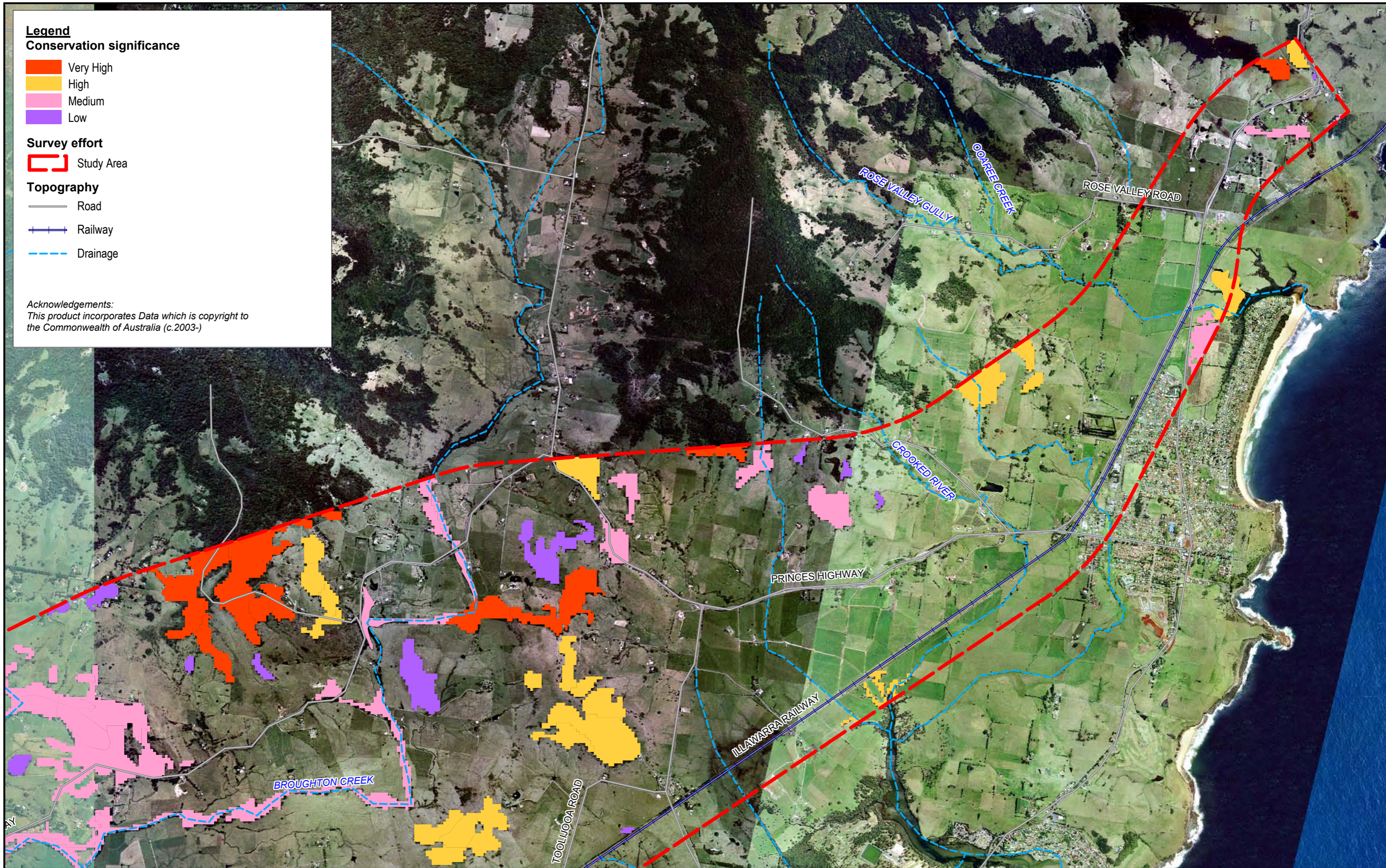


Figure 10a: Areas of conservation significance.

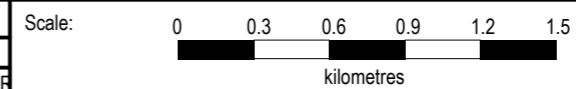
Figure 10a: Areas of conservation significance.

DATE: 23 October 2007

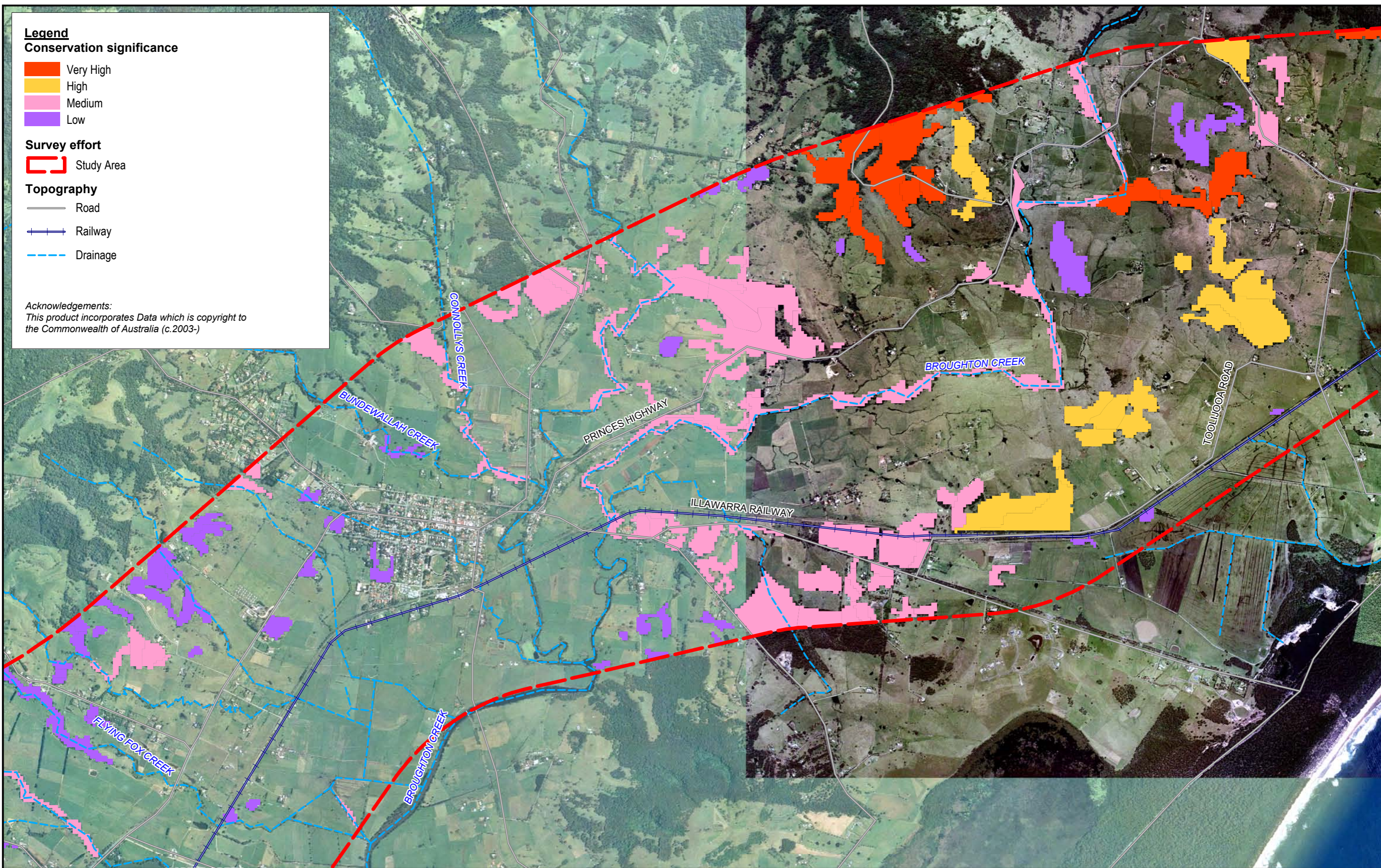
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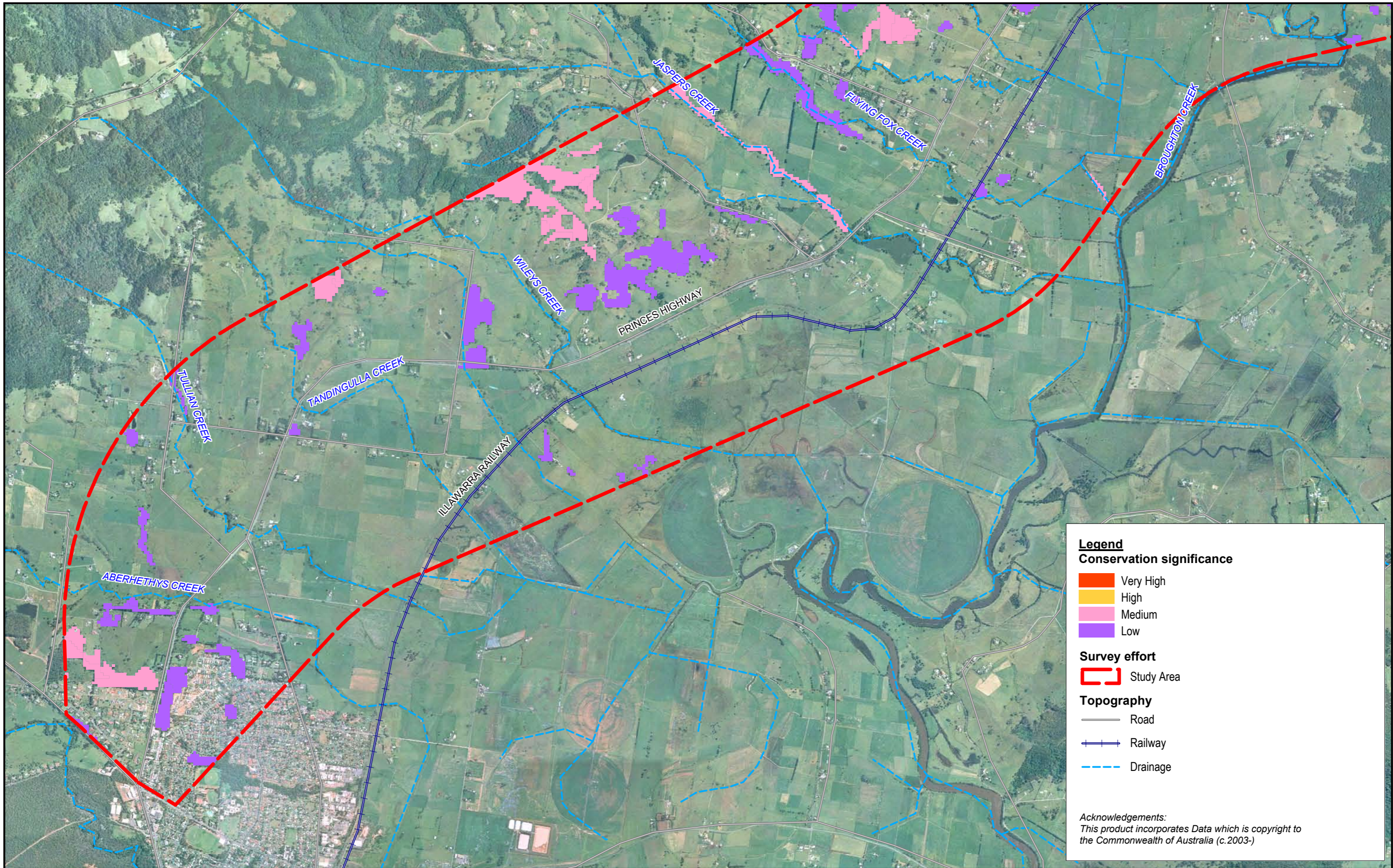
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Legend

Conservation significance

- Very High
- High
- Medium
- Low

Survey effort

- Study Area

Topography

- Road
- + Railway
- Drainage

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Figure 10c: Areas of conservation significance.

Figure 10c: Areas of conservation significance.



5.1.3 High

Areas that contained a relatively large area of an EEC, or other plant community of state or national significance, were deemed to be of high conservation significance (unless they contained sufficient additional attributes to be considered as “very high”). Other sections of the study area deemed to be of high conservation significance were locations that contained at least two of the following attributes:

- a) Moderately sized areas of an EEC or other plant community of state or national significance, or areas of other native vegetation connecting or acting as a buffer to areas of high or very high significance;
- b) Known or likely habitat for a high diversity of threatened species, or species of particular significance;
- c) Habitat important to the life cycle of threatened species, for example, breeding habitat; and
- d) Potential corridor values.

Locations deemed to be of high conservation significance were mainly situated on the higher elevations of Toolijooa ridge, between Foxground Road and Harley Hill. These areas typically contained relatively large patches of the EEC Illawarra subtropical rainforest, or moderately sized patches with some potential corridor values. One small, isolated patch of Illawarra subtropical rainforest on the western slopes of the ridge was deemed to be of high conservation significance on the basis that a large population of the threatened plant species *Zieria granulata* was present.

Other areas deemed to be of high conservation significance included a relatively large patch of the EEC swamp sclerophyll forest on the floodplain adjacent to Toolijooa Road, a SEPP 14 wetland located to the north of Gerringong, the remnants of an EEC at the end of Crooked River and a small patch of native vegetation occurring to the east of Gerringong which supports a large population of *Daphnandra* sp. C ‘Illawarra’.

5.1.4 Moderate

Sections of the study area deemed to be of moderate conservation significance were:

- a) Small, isolated patches of an EEC or other plant community of state or national significance;
- b) Heavily degraded riparian vegetation containing an EEC, or other native riparian vegetation connecting such areas;
- c) Relatively large patches of other native vegetation containing known or likely habitat for a range of threatened species; and
- d) Other native vegetation that was regarded as part of a potential local or sub-regional corridor.

Locations deemed to be of moderate conservation significance included riparian vegetation along sections of Broughton Creek, Broughton Mill Creek, Connollys Creek and Jaspers Creek. Sections of the riparian vegetation in these areas contained the highly degraded remnants of an EEC. In addition, some of the vegetation along these creeks (particularly Broughton Creek) included older, mature trees with hollows, a feature that was typically scarce or absent in the remainder of the study area.

5.1.5 Low

Sections of the study area deemed to be of low conservation significance (relative to other parts of the study area) were:

- a) Very small, isolated and highly modified patches of native vegetation, regardless of whether they contained an EEC or not;
- b) Relatively isolated and degraded patches of other native vegetation;
- c) Degraded areas of riparian vegetation with low or no corridor value; and
- d) Dams.

Sections of the study area deemed to be of relatively low constraint were typically locations where native vegetation occurs, but is relatively isolated and modified. Most of these areas provide limited habitat value for native flora and fauna and appear to have limited capacity for regeneration to a more natural structure without human intervention and the removal of existing disturbances (generally grazing).

Dams observed within the study area were not a natural feature of the landscape and, with some exceptions, were typically situated in open fields and paddocks. However, dams were included in this category because of their potential value to the maintenance of populations of some native species within the study area, particularly frogs, water birds and bats. Dams were not, however, included on the conservation significance mapping, because of the large number scattered throughout the study area.

5.1.6 Very low

The vast majority of the study area has been cleared of native vegetation and now comprises open fields and paddocks, often containing pasture improved to accommodate grazing and other agricultural activity. Major town centres within the study area (Gerringong, Berry and Bomaderry) are highly modified environments. These areas provide little or no habitat values for native flora and fauna and are considered to be of nil or very low conservation significance.

6.0 Summary

This report combines a range of existing literature and data with the results of field studies to assess relative conservation significance across the study area. Field studies were focussed on larger patches of native vegetation that occur within the study area and aimed to sample a range of plant communities. Field studies focussed particularly on sites within the Toolijooa range / Broughton Village areas, on the basis that the geographic location of these sites would be more likely to be affected by a highway upgrade than vegetation on the western periphery of the study area.

The investigations determined that, although the majority of the study area comprises cleared grazing land of limited value for flora and fauna conservation, there were a number of patches of native vegetation scattered across the landscape. These mainly occur along the foothills of the escarpment on the western side of the study area, on rocky ridges and slopes along Toolijooa ridge, along creeks and also some patches of varying size at lower elevations.

The investigations determined that some of these vegetation patches contained EEC and threatened plant species. The vegetation patches would also provide habitat for some threatened fauna, particularly relatively mobile fauna such as bats, and threatened microchiropteran bat species were detected within the study area during the course of the field investigations.

The investigations also found that areas along the western side of the study area are part of a major regional corridor. Corridors across the study area itself are limited; however, local linkages do occur and a potential corridor between Barren Grounds and Seven Mile Beach National Park has been identified in previous studies.

A range of criteria were then applied to assess relative conservation significance. Areas consisting of cleared paddocks were deemed of very low significance and therefore represent nil or low constraint to the construction of a new highway. Outside of the cleared paddocks, native vegetation was ranked from "low" to "very high" in terms of its relative significance to flora and fauna conservation within the study area.

7.0 Conclusions

The vast majority of the study area contains grazed paddocks. These, together with major town centres and urban areas are of limited value for native flora and fauna and represent little or no constraints to the construction of a highway upgrade. The exception to this is the many farm dams that are scattered throughout the study area. The majority of the dams are not a natural feature of the landscape; however, they do provide habitat for native species such as frogs and water birds and are likely to provide a water source and foraging area for other species such as bats, including some threatened species. Due to the large number of dams within the study area, it is likely that the construction of a highway upgrade would have limited impacts on this resource. Routes that avoid large dams, numerous dams or dams adjacent to woodland would have less impact than those that do not.

Native vegetation that does occur within the study area is typically comprised of relatively small and relatively isolated patches of regrowth vegetation, much of which is in poor or moderate condition. However, each of these vegetation patches represents a small area of habitat in an otherwise denuded landscape, and are therefore of at least local significance to native flora and fauna.

Much of the native vegetation that occurs along the western periphery of the study area along the foothills of the escarpment are extensions of much larger areas of vegetation that occur to the west. These areas are part of a major regional corridor and are likely to provide habitat for a range of threatened species. These areas are potentially of high constraint to the construction of a highway upgrade.

Native vegetation patches that occur within the more central parts of the study area were the focus of field investigations. A number of these patches contain EEC, some contain large populations of threatened plant species and almost all provide known or potential habitat for threatened fauna. Some of these patches, mainly in the area of the Toolijooa range, were assessed as being of “very high” conservation significance.

The major constraints to the construction of a highway upgrade are mainly in the area of the Toolijooa range, but also include some of the larger patches of native vegetation near Toolijooa Road and in the area of Broughton Village. Native vegetation that occurs along creeks in the study area is typically limited and degraded; however, it frequently contains the remnants of an EEC, some of the few hollow bearing trees in the study area and provide limited corridor values. Corridors across the study area itself are limited; however, local linkages do occur and a potential corridor between Barren Grounds and Seven Mile Beach National Park has been identified in previous studies.

8.0 Recommendations

The key recommendations in terms of protecting terrestrial flora and fauna values in the study area are to, wherever possible:

- a) Limit the clearance of native vegetation by selecting areas containing mainly pasture;
- b) Avoid habitat fragmentation by limiting native vegetation removal, if necessary, to the edges (rather than the middle) of existing patches;
- c) Avoid areas of conservation significance;
- d) Limit removal of native vegetation along creeks; and
- e) Consider appropriate mitigation strategies to maintain corridor values.

Consistent with the overall objective of this report, the detailed studies described herein have been used and will continue to be used in the selection of route options and later in the selection and evaluation of the preferred route.

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Appendix A Flora results



Appendix A Flora results

Ferns and fern-like plants

Adiantaceae	t1		
	t2	Adiantum aethiopicum	Common Maidenhair
		Adiantum formosum	Giant Maidenhair
		Adiantum hispidulum var. hispidulum	Rough Maidenhair
		Cheilanthes sieberi ssp. sieberi	Narrow Rock-fern
		Pellaea falcata	Sickle Fern
Aspleniaceae	t2	Asplenium flabellifolium	Necklace Fern
Blechnaceae	t2	Blechnum cartilagineum	Gristle Fern
		Blechnum patersonii ssp. patersonii	Strap Water-fern
		Doodia aspera	Prickly Rasp Fern
Cyatheaceae	t2	Cyathea australis	Rough Treefern
Davalliaceae	t2	Arthropteris tenella	Arthropteris 1632
		Nephrolepis cordifolia	Fishbone Fern
Dennstaedtiaceae	t2	Hypolepis muelleri	Harsh Ground Fern
		Pteridium esculentum	Bracken
Dicksoniaceae	t2	Calochlaena dubia	Common Ground Fern
Dryopteridaceae	t2	Lastreopsis microsora ssp. microsora	Creeping Shield-fern
Hymenophyllaceae	t2	Hymenophyllum cupressiforme	Common Filmy Fern
Lindsaeaceae	t2	Lindsaea linearis	Screw Fern
Ophioglossaceae	t2	Botrychium australe	Parsley Fern
Osmundaceae	t2	Todea barbara	King Fern
Polypodiaceae	t2	Microsorium scandens	Fragrant Fern
		Pyrrhosia rupestris	Rock Felt Fern
Pteridaceae	t2	Pteris umbrosa	Jungle Brake
Thelypteridaceae	t2	Christella dentata	Binung
Zamiaceae	t2	Macrozamia spp.	Macrozamia 9568
Conifers	t1		
Araucariaceae	t2	Araucaria spp.	Araucaria 9066
Pinaceae	t2		
		*	
		Pinus radiata	Radiata Pine
Podocarpaceae	t2	Podocarpus elatus	Plum Pine

Monocotyledons	t1		
Anthericaceae	t2		
		*	Arthropodium milleflorum Vanilla Lily
			Chlorophytum comosum Spider Plant
Araceae	t2		
		*	Alocasia brisbanensis Cunjevoi
			Colocasia esculenta Taro
			Gymnostachys anceps Settler's Flax
Arecaceae	t2		
			Livistona australis Cabbage Palm
Asparagaceae	t2		
		*	Asparagus densiflorus Sprengeri Fern
		*	Protasparagus aethiopicus Sprengeri Fern
Commelinaceae	t2		
			Aneilema acuminatum Aneilema 1334
			Commelina cyanea Native Wandering Jew
		*	Tradescantia fluminensis Wandering Jew
Cyperaceae	t2		
			Carex appressa Tall Sedge
			Carex longebrachiata Bergalia Tussock
			Carex spp. Carex 9178
			Cyathochaeta diandra Sheath Sedge
			Cyperus spp. Cyperus 9287
			Gahnia aspera Gahnia 5336
			Gahnia melanocarpa Black-fruit Saw-sedge
		*	Isolepis prolifera Proliferous Club-sedge
			Lepidosperma laterale Variable Sword-sedge
Dioscoreaceae	t2		
			Dioscorea transversa Native Yam
Iridaceae	t2		
			Libertia paniculata Branching Grass-flag
			Patersonia sericea Silky Purple-flag
		*	Watsonia bulbifera Watsonia 8038
Juncaceae	t2		
			Juncus spp. Juncus 9493
			Juncus usitatus Billabong Rush
Lomandraceae	t2		
			Lomandra longifolia Spiny-headed Mat-rush
			Lomandra multiflora ssp. multiflora Many-flowered Mat-rush
			Lomandra obliqua Lomandra 6192
Luzuriagaceae	t2		
			Eustrephus latifolius Wombat Berry
			Geitonoplesium cymosum Scrambling Lily
Orchidaceae	t2		
			Cryptostylis spp. Cryptostylis 9269
			Cryptostylis subulata Large Tongue Orchid
			Cymbidium suave Snake Orchid
			Dendrobium speciosum Rock Lily
			Dipodium punctatum Hyacinth Orchid
			Spiranthes sinensis ssp. australis Ladies Tresses

Phormiaceae	t2		Dianella caerulea var. caerulea Dianella caerulea var. producta Dianella longifolia var. longifolia Thelionema caespitosum	Paroo Lily Blue Flax-lily Pale Flax-lily Tufted Lily
Poaceae	t2	*	Andropogon virginicus Aristida ramosa var. ramosa Aristida vagans Austrodanthonia spp. Austrodanthonia tenuior Austrostipa pubescens	Whisky Grass Aristida 1578 Threeawn Speargrass Austrodanthonia 9098 Purplish Wallaby-grass Austrostipa 2069 Narrow-leaved Carpet Grass
		*	Axonopus affinis	Quaking Grass
		*	Briza maxima	Prairie Grass
		*	Bromus cartharticus	Barbed Wire Grass
			Cymbopogon refractus	Common Couch
			Cynodon dactylon	Shorthair Plumegrass
			Dichelachne micrantha	Forest Hedgehog Grass
		*	Echinopogon ovatus	Panic Veldtgrass
		*	Ehrharta erecta	Bordered Panic
			Entolasia marginata	Wiry Panic
			Entolasia stricta	Brown's Lovegrass
			Eragrostis brownii	Eragrostis 9358
			Eragrostis spp.	Yorkshire Fog
		*	Holcus lanatus	Blady Grass
			Imperata cylindrica var. major	Weeping Grass
			Microlaena stipoides var. stipoides	Basket Grass
			Oplismenus aemulus	Oplismenus 6580
			Oplismenus imbecillis	Two-colour Panic
			Panicum simile	Panicum 9667
		*	Panicum spp.	Paspalum
		*	Paspalum dilatatum	Vasey Grass
		*	Paspalum urvillei	Kikuyu Grass
		*	Pennisetum clandestinum	Tussock
			Poa labillardierei var. labillardierei	Sporobolus 9842
		*	Sporobolus spp.	Buffalo Grass
		*	Stenotaphrum secundatum	Kangaroo Grass
			Themeda australis	
Ripogonaceae	t2		Ripogonum album	White Supplejack
Smilacaceae	t2		Smilax australis Smilax glycyphylla	Sarsaparilla Sweet Sarsaparilla
Typhaceae	t2		Typha spp.	Typha 9899
Uvulariaceae	t2		Schelhammera undulata	Lilac Lily
Xanthorrhoeaceae	t2		Xanthorrhoea spp.	Xanthorrhoea 9928
Zingiberaceae	t2		Alpinia caerulea	Native Ginger

Dicotyledons	t1		
Acanthaceae	t2		
		Brunoniella pumilio	Dwarf Blue Trumpet
		Pseuderanthemum variabile	Pastel Flower
		Thunbergia alata	Black-eyed Susan
Aizoaceae	t2		
		Tetragonia tetragonioides	New Zealand Spinach
Amaranthaceae	t2		
		Deeringia amaranthoides	Deeringia 4292
Apiaceae	t2		
		Centella asiatica	Pennywort
		Hydrocotyle laxiflora	Stinking Pennywort
		Hydrocotyle peduncularis	Pennywort
		Hydrocotyle spp.	Hydrocotyle 9467
		Platysace linearifolia	Platysace 6960
Apocynaceae	t2		
		Parsonsia straminea	Common Silkpod
Araliaceae	t2		
		Cephalalaria cephalobotrys	Climbing Panax
		Polyscias elegans	Celery Wood
		Polyscias murrayi	Pencil Cedar
Asclepiadaceae	t2		
	*	Araujia hortorum	Araujia 1476
		Marsdenia flavescens	Hairy Milk Vine
		Marsdenia rostrata	Common Milk Vine
		Tylophora barbata	Bearded Tylophora
Asteraceae	t2		
	*	Ageratina adenophora	Crofton Weed
	*	Ageratina riparia	Mistflower
	*	Bidens pilosa	Cobbler's Pegs
		Cassinia spp.	Cassinia 9185
	*	Cirsium vulgare	Spear Thistle
	*	Conyza albida	Tall Fleabane
		Conyza spp.	Conyza 9243
	*	Delairea odorata	Cape Ivy
		Helichrysum elatum	Tall Everlasting
	*	Hypochaeris radicata	Catsear
		Leptinella longipes	Coast Cotula
		Olearia viscidula	Wallaby Weed
		Ozothamnus diosmifolius	White Dogwood
	*	Senecio madagascariensis	Fireweed
		Senecio spp.	Senecio 9815
		Sigesbeckia orientalis ssp. orientalis	Indian Weed
	*	Sonchus oleraceus	Common Sowthistle
	*	Tagetes minuta	Stinking Roger
		Vernonia cinerea var. cinerea	Vernonia 7975
Basellaceae	t2		
	*	Anredera cordifolia	Madeira Vine
Bignoniaceae	t2		
	*	Jacaranda mimosifolia	Jacaranda
		Pandorea pandorana ssp. pandorana	Wonga Vine
	*	Tecoma capensis	Cape Honeysuckle

Boraginaceae	t2		Ehretia acuminata var. acuminata	Koda
Campanulaceae	t2		Wahlenbergia spp.	Wahlenbergia 9918
Caprifoliaceae	t2	*	Lonicera japonica	Japanese Honeysuckle
Caryophyllaceae	t2		Stellaria flaccida	Forest Starwort
Casuarinaceae	t2		Allocasuarina littoralis	Black Sheoak
			Casuarina cunninghamiana ssp. cunninghamiana	Casuarina 3565
			Casuarina glauca	Swamp Oak
Celastraceae	t2		Cassine australis var. australis	Red Olive-berry
			Celastrus australis	Staff Vine
			Celastrus spp.	Celastrus 9190
			Celastrus subspicata	Celastrus 3585
			Maytenus silvestris	Narrow-leaved Orangebark
Chenopodiaceae	t2		Atriplex cinerea	Grey Saltbush
		*	Atriplex prostrata	Hastate Orache
			Einadia hastata	Berry Saltbush
			Sarcocornia quinqueflora ssp. quinqueflora	Beaded Glasswort
			Suaeda australis	Austral Seablite
Convolvulaceae	t2		Dichondra repens	Kidney Weed
Crassulaceae	t2		Sedum spp.	Sedum 9812
Cunoniaceae	t2		Aphanopetalum resinosum	Gum Vine
Dilleniaceae	t2		Hibbertia dentata	Twining Guinea Flower
			Hibbertia diffusa	Wedge Guinea-flower
			Hibbertia scandens	Climbing Guinea Flower
Ebenaceae	t2		Diospyros australis	Black Plum
Elaeocarpaceae	t2		Elaeocarpus kirtonii	Silver Quandong
			Elaeocarpus reticulatus	Blueberry Ash
Epacridaceae	t2		Epacris microphylla var. microphylla	Coast Coral Heath
			Epacris pulchella	Epacris 4788
			Leucopogon juniperinus	Long-flower Beard-heath
			Leucopogon lanceolatus var. lanceolatus	Lance Beard-heath
Escalloniaceae	t2		Abrophyllum ornans	Native Hydrangea
			Polyosma cunninghamii	Featherwood

Euphorbiaceae	t2	Baloghia inophylla Breynia oblongifolia Claoxylon australe Croton verreauxii Glochidion ferdinandi var. ferdinandi * Omalanthus populifolius * Ricinus communis	Brush Bloodwood Coffee Bush Brittlewood Native Cascarilla Cheese Tree Omalanthus 6571 Castor Oil Plant
Eupomatiaceae	t2	Eupomatia laurina	Bolwarra
Fabaceae (Mimosoideae)	t2	Acacia binervata Acacia decurrens Acacia falcata Acacia longifolia Acacia maidenii Acacia mearnsii Acacia melanoxylon Acacia myrtifolia Acacia parramattensis Acacia spp. Acacia suaveolens Acacia terminalis ssp. angustifolia ms. (Constable 7376) Acacia ulicifolia	Two-veined Hickory Black Wattle Acacia 0365 Coast/Sallow Wattle Maiden's Wattle Black Wattle Blackwood Red-stemmed Wattle Parramatta Wattle Acacia 9003 Sweet Wattle Acacia 0673 Prickly Moses
Fabaceae (Faboideae)	t2	Daviesia ulicifolia ssp. ulicifolia Desmodium rhytidophyllum Desmodium varians Dillwynia retorta (J.C.Wendl.) Druce species complex * Erythrina X sykesii Glycine clandestina Glycine tabacina Gompholobium minus Hardenbergia violacea Indigofera australis Kennedia rubicunda Mirbelia rubiifolia	Gorse Bitter-pea Desmodium 4369 Slender Tick-trefoil Dillwynia 4481 Coral tree Twining Glycine Variable Glycine Dwarf Wedge Pea False Sarsaparilla Austral Indigo Red Kennedy Pea Heathy Mirbelia
Fabaceae (Mimosoideae)	t2	Pararchidendron pruinoseum var. pruinoseum	Snow Wood
Fabaceae (Faboideae)	t2	Platylobium formosum ssp. formosum Pultenaea retusa	Handsome Flat-pea Blunt Bush-pea
Fabaceae (Caesalpinioideae)	t2	* Senna pendula var. glabrata	Cassia

Fabaceae (Faboideae)	t2	*	<i>Trifolium repens</i>	White Clover
Flacourtiaceae	t2		<i>Scolopia braunii</i>	Flintwood
Gentianaceae	t2	*	<i>Centaurium tenuiflorum</i>	Slender Centaury
Geraniaceae	t2		<i>Geranium homeanum</i>	Northern Cranesbill
Goodeniaceae	t2		<i>Goodenia hederacea</i> ssp. <i>hederacea</i> <i>Goodenia heterophylla</i> ssp. <i>eglandulosa</i>	Ivy Goodenia Goodenia 5490
Haloragaceae	t2		<i>Gonocarpus teucrioides</i>	Germander Raspwort
Icacinaceae	t2		<i>Pennantia cunninghamii</i>	Brown Beech
Lamiaceae	t2		<i>Plectranthus parviflorus</i> <i>Prunella vulgaris</i>	Cockspur Flower Self-heal
Lauraceae	t2	*	<i>Cassytha glabella</i> f. <i>glabella</i> <i>Cinnamomum camphora</i> <i>Cryptocarya glaucescens</i> <i>Cryptocarya microneura</i>	Slender Dodder-laurel Camphor Laurel Jackwood Murrogun
Lobeliaceae	t2		<i>Pratia purpurascens</i>	Whiteroot
Loranthaceae	t2		<i>Amyema gaudichaudii</i> <i>Amyema</i> spp. <i>Amylothea dictyophleba</i>	Amyema 1284 Amyema 9052 Amylothea 1314
Malaceae	t2	*	<i>Eriobotrya japonica</i> <i>Malus</i> spp.	Loquat Malus 9572
Malvaceae	t2	*	<i>Abutilon oxycarpum</i> <i>Sida rhombifolia</i>	Flannel Weed Paddy's Lucerne
Meliaceae	t2		<i>Melia azedarach</i> <i>Toona ciliata</i>	White Cedar Red Cedar
Menispermaceae	t2		<i>Legnephora moorei</i> <i>Sarcopetalum harveyanum</i> <i>Stephania japonica</i> var. <i>discolor</i>	Round-leaf Vine Pearl Vine Snake Vine
Monimiaceae	t2		<i>Doryphora sassafras</i> <i>Palmeria scandens</i> <i>Wilkiea huegeliana</i>	Sassafras Anchor Vine Veiny Wilkiea

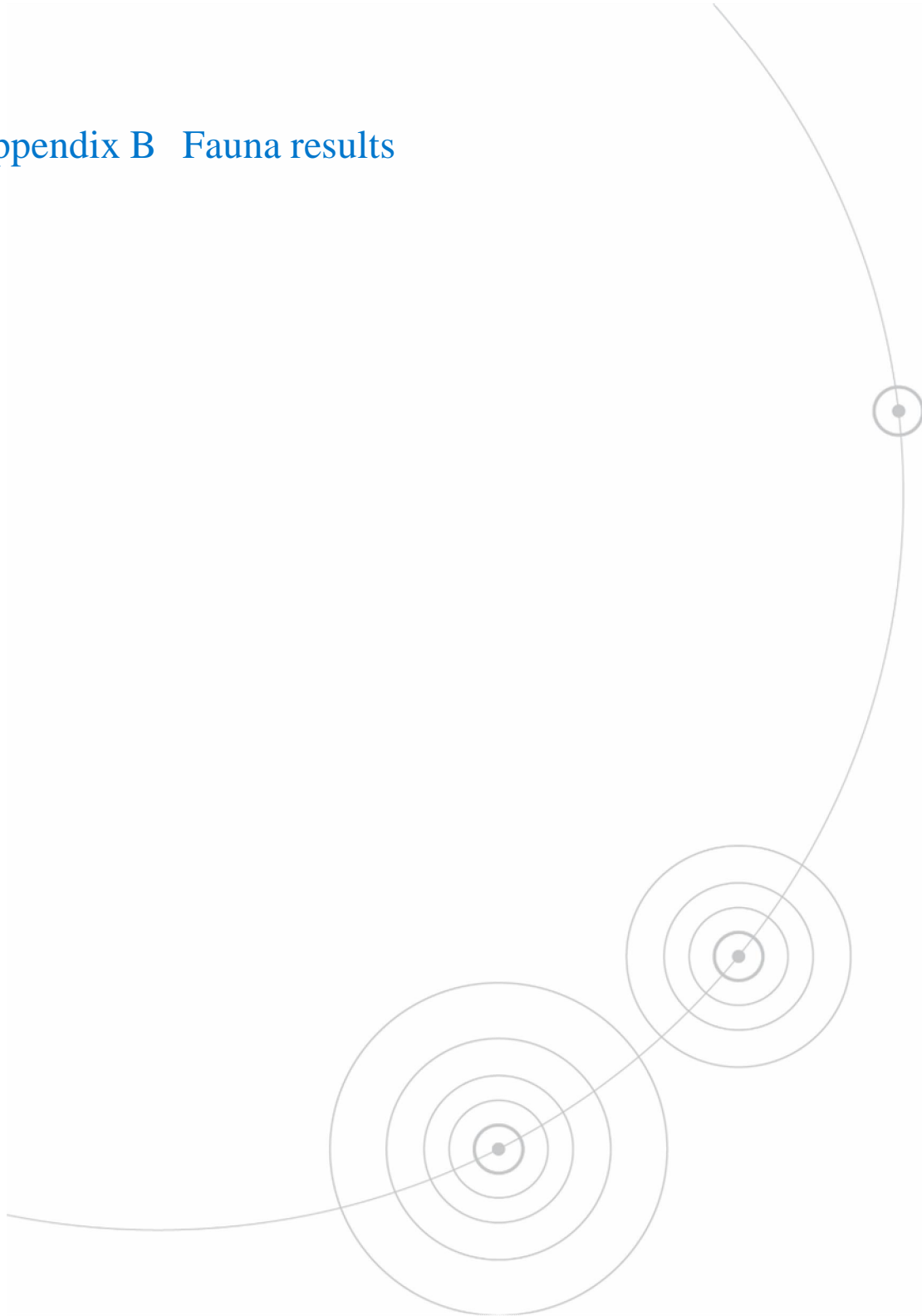
Moraceae	t2		
		Ficus coronata	Creek Sandpaper Fig
		Ficus macrophylla ssp. macrophylla	Moreton Bay Fig
		Ficus obliqua var. obliqua	Ficus 5267
		Ficus rubiginosa	Ficus 5270
		Ficus spp.	Ficus 9384
		Ficus watkinsiana	Strangling Fig
		Maclura cochinchinensis	Cockspur Thorn
		Streblus brunonianus	Whalebone Tree
Myoporaceae	t2		
		Myoporum acuminatum	Myoporum 6451
Myrsinaceae	t2		
		Rapanea howittiana	Brush Muttonwood
		Rapanea variabilis	Muttonwood
Myrtaceae	t2		
		Acmena smithii	Lilly Pilly
		Angophora floribunda	Rough-barked Apple
		Backhousia myrtifolia	Grey Myrtle
		Callistemon rigidus	Stiff Bottlebrush
		Callistemon salignus	Willow Bottlebrush
		Corymbia gummifera	Red Bloodwood
		Corymbia maculata	Spotted Gum
		Eucalyptus amplifolia ssp. amplifolia	Eucalyptus 4926
		Eucalyptus botryoides	Bangalay
		Eucalyptus eugenioides	Thin-leaved Stringybark
		Eucalyptus paniculata ssp. paniculata	Grey Ironbark
		Eucalyptus pilularis	Blackbutt
		Eucalyptus piperita	Sydney Peppermint
		Eucalyptus quadrangulata	White-topped Box
		Eucalyptus robusta	Swamp Mahogany
		Eucalyptus saligna	Sydney Blue Gum
		Eucalyptus scias ssp. scias	Eucalyptus 5163
		Eucalyptus sclerophylla	Hard-leaved Scribbly Gum
		Eucalyptus spp.	Eucalyptus 9373
		Kunzea ambigua	Tick Bush
		Leptospermum continentale	Prickly Teatree
		Leptospermum polygalifolium ssp. polygalifolium	Tantoon
		Leptospermum trinervium	Paperbark Tea-tree
		Melaleuca linariifolia	Budjur
		Melaleuca styphelioides	Prickly-leaved Tea Tree
		Rhodamnia rubescens	Scrub Turpentine
		Syncarpia glomulifera ssp. glomulifera	Turpentine
		Synoum glandulosum ssp. glandulosum	Bastard Rosewood
		Tristaniopsis laurina	Kanuka
Ochnaceae	t2		
		*	
		Ochna serrulata	Mickey Mouse Plant

Oleaceae	t2	*	<i>Ligustrum lucidum</i>	Large-leaved Privet
		*	<i>Ligustrum sinense</i>	Small-leaved Privet
			<i>Notelaea venosa</i>	Veined Mock-olive
		*	<i>Olea europaea</i>	Common Olive
Oxalidaceae	t2		<i>Oxalis perennans</i>	Grassland Wood-sorrel
			<i>Oxalis</i> spp.	<i>Oxalis</i> 9662
Passifloraceae	t2	*	<i>Passiflora edulis</i>	Common Passionfruit
			<i>Passiflora herbertiana</i> ssp. <i>herbertiana</i>	Native Passionfruit
Phytolaccaceae	t2	*	<i>Phytolacca octandra</i>	Inkweed
Piperaceae	t2		<i>Piper novae-hollandiae</i>	Giant Pepper Vine
Pittosporaceae	t2		<i>Billardiera scandens</i> var. <i>scandens</i>	Common Apple-berry
			<i>Bursaria spinosa</i> ssp. <i>spinosa</i>	Sweet Bursaria
			<i>Pittosporum multiflorum</i>	Orange Thorn
			<i>Pittosporum revolutum</i>	Rough Fruit Pittosporum
			<i>Pittosporum undulatum</i>	Sweet Pittosporum
Plantaginaceae	t2	*	<i>Plantago lanceolata</i>	Lamb's Tongues
Polygonaceae	t2		<i>Acetosella vulgaris</i>	Sheep Sorrel
			<i>Persicaria decipiens</i>	Slender Knotweed
			<i>Persicaria</i> spp.	<i>Persicaria</i> 9685
Proteaceae	t2		<i>Banksia spinulosa</i> var. <i>collina</i>	Banksia 2285
			<i>Grevillea robusta</i>	Silky Oak
			<i>Hakea dactyloides</i>	Finger Hakea
			<i>Hakea salicifolia</i> ssp. <i>salicifolia</i>	Hakea 5663
			<i>Lambertia formosa</i>	Mountain Devil
			<i>Persoonia levis</i>	Broad-leaved Geebung
			<i>Persoonia linearis</i>	Narrow-leaved Geebung
			<i>Persoonia mollis</i> ssp. <i>leptophylla</i>	<i>Persoonia</i> 6779
			<i>Petrophile sessilis</i>	<i>Petrophile</i> 6810
			<i>Stenocarpus salignus</i>	Scrub Beefwood
Ranunculaceae	t2		<i>Clematis aristata</i>	Mountain Clematis
		*	<i>Ranunculus sceleratus</i>	Celery Buttercup
			<i>Ranunculus</i> spp.	<i>Ranunculus</i> 9759
Rhamnaceae	t2		<i>Alphitonia excelsa</i>	Red Ash
			<i>Pomaderris ferruginea</i>	Rusty Pomaderris
Rosaceae	t2	*	<i>Rubus fruticosus</i>	Blackberry complex
			<i>Rubus moluccanus</i> var. <i>trilobus</i>	Molucca Bramble
			<i>Rubus parvifolius</i>	Native Raspberry
			<i>Rubus rosifolius</i> var. <i>rosifolius</i>	Rose-leaf Bramble
			<i>Rubus</i> spp.	<i>Rubus</i> 9780

Rubiaceae	t2		Morinda jasminoides Opercularia diphylla Pomax umbellata Psychotria loniceroides	Jasmine Morinda Stinkweed Pomax Hairy Psychotria
Rutaceae	t2		Acronychia oblongifolia	Common Acronychia
		*	Citrus limonia	Rough Lemon
			Correa reflexa var. reflexa	Native Fuschia
			Melicope micrococca	Hairy-leaved Doughwood
E	e		Zieria granulata Zieria smithii	Zieria 8121 Sandfly Zieria
Salicaceae	t2			
		*	Salix babylonica	Weeping Willow
Sambucaceae	t2			
			Sambucus australasica	Native Elderberry
Santalaceae	t2			
			Exocarpos cupressiformis Santalum obtusifolium	Native Cherry Sandalwood
Sapindaceae	t2			
			Alectryon subcinereus Diploglottis australis Dodonaea triquetra Guioa semiglauca	Wild Quince Native Tamarind Large-leaf Hop-bush Guioa
Sapotaceae	t2			
			Planchonella australis	Black Apple
Scrophulariaceae	t2			
			Veronica plebeia	Trailing Speedwell
Solanaceae	t2			
			Duboisia myoporoides	Corkwood
		*	Lycium ferocissimum	African Boxthorn
		*	Solanum mauritianum	Wild Tobacco Bush
		*	Solanum nigrum	Black-berry Nightshade
		*	Solanum pseudocapsicum Solanum spp.	Madeira Winter Cherry Solanum 9826
Sterculiaceae	t2			
			Brachychiton acerifolius Commersonia fraseri	Illawarra Flame Tree Brush Kurrajong
Symplocaceae	t2			
			Symplocos thwaitesii	Buff Hazelwood
Thymelaeaceae	t2			
			Pimelea linifolia ssp. linifolia	Slender Rice-flower
Ulmaceae	t2			
			Trema tomentosa var. viridis	Native Peach
Urticaceae	t2			
			Dendrocnide excelsa Urtica incisa	Giant Stinging Tree Stinging Nettle

Verbenaceae	t2		Clerodendrum tomentosum	Hairy Clerodendrum
		*	Lantana camara	Lantana
		*	Verbena bonariensis	Purpletop
		*	Verbena rigida	Veined Verbena
Violaceae	t2		Hymenanthera dentata	Tree Violet
			Viola hederacea	Ivy-leaved Violet
Vitaceae	t2		Cayratia clematidea	Slender Grape
			Cissus antarctica	Water Vine
			Cissus hypoglauca	Giant Water Vine

Appendix B Fauna results



Appendix B Fauna results

Family	Latin name	Common name	EPBC Act	TSC Act
Amphibians				
Hylidae	<i>Litoria dentata</i>	Bleating Tree Frog		
Hylidae	<i>Litoria fallax</i>	Eastern Dwarf Tree Frog		
Hylidae	<i>Litoria peronii</i>	Peron's Tree Frog		
Hylidae	<i>Litoria verreauxii</i>	Litoria verreauxii		
Myobatrachidae	<i>Crinia signifera</i>	Common Eastern Froglet		
Myobatrachidae	<i>Limnodynastes peronii</i>	Brown-striped Frog		
Myobatrachidae	<i>Pseudophryne bibronii</i>	Brown Toadlet		
Reptiles				
Agamidae	<i>Physignathus lesueurii</i>	Eastern Water Dragon		
Boidae	<i>Morelia spilota spilota</i>	Diamond Python		
Chelidae	<i>Chelodina longicollis</i>	Eastern Long-necked Tortoise		
Elapidae	<i>Pseudechis porphyriacus</i>	Red-bellied Black Snake		
Scincidae	<i>Ctenotus robustus</i>	Striped Skink		
Scincidae	<i>Eulamprus quoyii</i>	Eastern Water Skink		
Scincidae	<i>Lampropholis delicata</i>	Grass Skink		
Scincidae	<i>Lampropholis guichenoti</i>	Garden Skink		
Scincidae	<i>Tiliqua scincoides</i>	Eastern Blue-tongued Lizard		
Native Birds				
Accipitridae	<i>Accipiter cirrhocephalus</i>	Collared Sparrowhawk		
Accipitridae	<i>Accipiter fasciatus</i>	Brown Goshawk		
Accipitridae	<i>Aquila audax</i>	Wedge-tailed Eagle		
Accipitridae	<i>Circus approximans</i>	Swamp Harrier		
Accipitridae	<i>Elanus axillaris</i>	Black-shouldered Kite		
Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied Sea-eagle	M	
Accipitridae	<i>Hieraaetus morphnoides</i>	Little Eagle		
Anatidae	<i>Anas castanea</i>	Chestnut Teal		
Anatidae	<i>Anas gracilis</i>	Grey Teal		
Anatidae	<i>Anas superciliosa</i>	Pacific Black Duck		
Anatidae	<i>Chenonetta jubata</i>	Australian Wood Duck		
Anatidae	<i>Cygnus atratus</i>	Black Swan		
Apodidae	<i>Apus pacificus</i>	Fork-tailed Swift	M	
Ardeidae	<i>Ardea pacifica</i>	White-necked Heron		
Ardeidae	<i>Egretta novaehollandiae</i>	White-faced Heron		
Artamidae	<i>Artamus cyanopterus</i>	Dusky Woodswallow		
Artamidae	<i>Cracticus torquatus</i>	Grey Butcherbird		
Artamidae	<i>Grallina cyanoleuca</i>	Magpie-lark		
Artamidae	<i>Gymnorhina tibicen</i>	Australian Magpie		
Artamidae	<i>Strepera graculina</i>	Pied Currawong		
Cacatuidae	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo		
Cacatuidae	<i>Cacatua roseicapilla</i>	Galah		

Family	Latin name	Common name	EPBC Act	TSC Act
Amphibians				
Cacatuidae	<i>Cacatua sanguinea</i>	Little Corella		
Cacatuidae	<i>Cacatua tenuirostris</i>	Long-billed Corella		
Cacatuidae	<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo		V
Cacatuidae	<i>Calyptorhynchus funereus</i>	Yellow-tailed Black-Cockatoo		
Cacatuidae	<i>Calyptorhynchus lathami</i>	Glossy Black-cockatoo		V
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		
Campephagidae	<i>Coracina tenuirostris</i>	Cicadabird		
Charadriidae	<i>Vanellus miles</i>	Masked Lapwing		
Cinclosomatidae	<i>Psophodes olivaceus</i>	Eastern Whipbird		
Climacteridae	<i>Cormobates leucophaeus</i>	White-throated Treecreeper		
Columbidae	<i>Columba leucomela</i>	White-headed Pigeon		
Columbidae	<i>Geopelia humeralis</i>	Bar-shouldered Dove		
Columbidae	<i>Leucosarcia melanoleuca</i>	Wonga Pigeon		
Columbidae	<i>Lopholaimus antarcticus</i>	Topknot Pigeon		
Columbidae	<i>Macropygia amboinensis</i>	Brown Cuckoo-Dove		
Columbidae	<i>Ocyphaps lophotes</i>	Crested Pigeon		
Columbidae	<i>Phaps chalcoptera</i>	Common Bronzewing		
Coraciidae	<i>Eurystomus orientalis</i>	Dollarbird		
Corvidae	<i>Corvus coronoides</i>	Australian Raven		
Cuculidae	<i>Cuculus pallidus</i>	Pallid Cuckoo		
Cuculidae	<i>Eudynamys scolopacea</i>	Common Koel		
Dicruridae	<i>Monarcha melanopsis</i>	Black-faced Monarch	M	
Dicruridae	<i>Rhipidura fuliginosa</i>	Grey Fantail		
Dicruridae	<i>Rhipidura leucophrys</i>	Willie Wagtail		
Dicruridae	<i>Rhipidura rufifrons</i>	Rufous Fantail	M	
Falconidae	<i>Falco cenchroides</i>	Nankeen Kestrel		
Falconidae	<i>Falco peregrinus</i>	Peregrine Falcon		
Halcyonidae	<i>Dacelo novaeguineae</i>	Laughing Kookaburra		
Halcyonidae	<i>Todiramphus sanctus</i>	Sacred Kingfisher		
Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow		
Hirundinidae	<i>Hirundo nigricans</i>	Tree Martin		
Maluridae	<i>Malurus cyaneus</i>	Superb Fairy-wren		
Maluridae	<i>Malurus lamberti</i>	Variiegated Fairy-wren		
Maluridae	<i>Stipiturus malachurus</i>	Southern Emu-wren		
Meliphagidae	<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill		
Meliphagidae	<i>Anthochaera carunculata</i>	Red Wattlebird		
Meliphagidae	<i>Anthochaera chrysoptera</i>	Little Wattlebird		
Meliphagidae	<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater		
Meliphagidae	<i>Manorina melanocephala</i>	Noisy Miner		
Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's Honeyeater		
Meliphagidae	<i>Philemon citreogularis</i>	Little Friarbird		

Family	Latin name	Common name	EPBC Act	TSC Act
Native Birds				
Meliphagidae	<i>Philemon corniculatus</i>	Noisy Friarbird		
Meliphagidae	<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater		
Motacillidae	<i>Anthus novaeseelandiae</i>	Richard's Pipit		
Muscicapidae	<i>Acrocephalus stentoreus</i>	Clamorous Reed-Warbler	M	
Oriolidae	<i>Oriolus sagittatus</i>	Olive-backed Oriole		
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrike-thrush		
Pachycephalidae	<i>Falcunculus frontatus</i>	Crested Shrike-tit		
Pachycephalidae	<i>Pachycephala pectoralis</i>	Golden Whistler		
Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler		
Pardalotidae	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill		
Pardalotidae	<i>Acanthiza pusilla</i>	Brown Thornbill		
Pardalotidae	<i>Acanthiza reguloides</i>	Buff-rumped Thornbill		
Pardalotidae	<i>Gerygone mouki</i>	Brown Gerygone		
Pardalotidae	<i>Pardalotus punctatus</i>	Spotted Pardalote		
Pardalotidae	<i>Sericornis frontalis</i>	White-browed Scrubwren		
Passeridae	<i>Neochmia temporalis</i>	Red-browed Finch		
Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian Pelican		
Petroicidae	<i>Eopsaltria australis</i>	Eastern Yellow Robin		
Petroicidae	<i>Microeca fascinans</i>	Jacky Winter		
Phalacrocoracidae	<i>Phalacrocorax carbo</i>	Great Cormorant		
Phalacrocoracidae	<i>Phalacrocorax melanoleucos</i>	Little Pied Cormorant		
Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant		
Phalacrocoracidae	<i>Phalacrocorax varius</i>	Pied Cormorant		
Podargidae	<i>Podargus strigoides</i>	Tawny Frogmouth		
Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe		
Psittacidae	<i>Alisterus scapularis</i>	Australian King-Parrot		
Psittacidae	<i>Platycercus elegans</i>	Crimson Rosella		
Psittacidae	<i>Platycercus eximius</i>	Eastern Rosella		
Psittacidae	<i>Trichoglossus chlorolepidotus</i>	Scaly-breasted Lorikeet		
Psittacidae	<i>Trichoglossus haematodus</i>	Rainbow Lorikeet		
Ptilonorhynchidae	<i>Ailuroedus crassirostris</i>	Green Catbird		
Ptilonorhynchidae	<i>Ptilonorhynchus violaceus</i>	Satin Bowerbird		
Rallidae	<i>Fulica atra</i>	Eurasian Coot		
Rallidae	<i>Gallirallus philippensis</i>	Buff-banded Rail		
Rallidae	<i>Porphyrio porphyrio</i>	Purple Swamphen		
Strigidae	<i>Ninox novaeseelandiae</i>	Southern Boobook		
Threskiornithidae	<i>Platalea regia</i>	Royal Spoonbill		
Threskiornithidae	<i>Threskiornis molucca</i>	Australian White Ibis		
Threskiornithidae	<i>Threskiornis spinicollis</i>	Straw-necked Ibis		

Family	Latin name	Common name	EPBC Act	TSC Act
Native Birds				
Zosteropidae	<i>Zosterops lateralis</i>	Silvereye		
Anatidae	<i>Anas platyrhynchos</i>	Mallard		U
Introduced Birds				
Fringillidae	<i>Carduelis carduelis</i>	European Goldfinch		U
Muscicapidae	<i>Turdus merula</i>	Common Blackbird		U
Passeridae	<i>Passer domesticus</i>	House Sparrow		U
Pycnonotidae	<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul		U
Sturnidae	<i>Acridotheres tristis</i>	Common Myna		U
Sturnidae	<i>Sturnus vulgaris</i>	Common Starling		U
Native Mammals				
Dasyuridae	<i>Antechinus stuartii</i>	Brown Antechinus		
Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail Bat		V
Macropodidae	<i>Macropus giganteus</i>	Eastern Grey Kangaroo		
Macropodidae	<i>Wallabia bicolor</i>	Swamp Wallaby		
Molossidae	<i>Mormopterus norfolkensis</i>	Eastern Freetail Bat		V
Molossidae	<i>Nyctinomus australis</i>	White-striped Freetail Bat		
Muridae	<i>Rattus fuscipes</i>	Bush Rat		
Petauridae	<i>Petaurus breviceps</i>	Sugar Glider		
Petauridae	<i>Pseudocheirus peregrinus</i>	Common Ringtail Possum		
Phalangeridae	<i>Trichosurus vulpecula</i>	Common Brushtail Possum		
Pteropodidae	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V
Rhinolophidae	<i>Rhinolophus megaphyllus</i>	Eastern Horseshoe-bat		
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna		
Vespertilionidae	<i>Miniopterus schreibersii oceanensis</i>	Eastern Bent-wing Bat	C	V
Vespertilionidae	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V
Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat		
Vespertilionidae	<i>Chalinolobus morio</i>	Chocolate Wattled Bat		
Vespertilionidae	<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle		V
Vespertilionidae	<i>Myotis adversus</i>	Large-footed Myotis		V
Vespertilionidae	<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat		
Vespertilionidae	<i>Nyctophilus gouldi</i>	Gould's Long-eared Bat		
Vespertilionidae	<i>Nyctophilus sp.</i>	long-eared bat		
Vespertilionidae	<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat		V
Vespertilionidae	<i>Scotorepens orion</i>	Eastern Broad-nosed Bat		
Vespertilionidae	<i>Vespadelus darlingtoni</i>	Large Forest Bat		
Vespertilionidae	<i>Vespadelus pumilus</i>	Eastern Forest Bat		
Vespertilionidae	<i>Vespadelus regulus</i>	Southern Forest Bat		
Vespertilionidae	<i>Vespadelus vulturinus</i>	Little Forest Bat		
Vombatidae	<i>Vombatus ursinus</i>	Common Wombat		

Family	Latin name	Common name	EPBC Act	TSC Act
Introduced Mammals				
Canidae	<i>Vulpes vulpes</i>	Fox		U
Leporidae	<i>Lepus capensis</i>	Brown Hare		U
Leporidae	<i>Oryctolagus cuniculus</i>	Rabbit		U