

**EXTRACTS:
FLORA AND FAUNA STUDY
THE CEDARS
BUNKERS HILL, KANGAROO VALLEY
CITY OF SHOALHAVEN**

**KEVIN MILLS & ASSOCIATES PTY LIMITED
ECOLOGICAL AND ENVIRONMENTAL CONSULTANTS
222 NORTH CURRAMORE ROAD, JAMBEROO, NSW 2533**
Telephone: 02 4236 0620 Facsimile: 02 4236 0664 ACN 003 441 610

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1 VEGETATION

1.1 VEGETATION COMMUNITIES

General Vegetation Patterns

The natural vegetation on the property consists of rainforest, three eucalypt forest communities and riparian forest. These communities were described in the previous report (K. Mills & Associates 1996) and are described again, below. Of these, rainforest and riparian forest are the most restricted communities, and both have been cleared extensively in Kangaroo Valley. Eucalypt forest is still relatively common, covering most of the slopes below the escarpments in the northern and southern parts of the valley. Where the native vegetation has been cleared, the land supports a grassland dominated by introduced herbaceous species; these areas are grazed by horses and cattle.

i. Moist Subtropical Rainforest

Map Unit: MST-SRF

Occurrence: Moist subtropical rainforest mainly occurs on the upper slopes, on soils derived from the Illawarra Coal Measures, although patches also occur lower on the escarpment. The rainforest in the region, including the rainforest in and near the study area, was mapped from aerial photographs by Mills (1989).

Structure: This community is a closed forest about 25 metres in height. The understorey is rather open and life forms such as ferns, epiphytes and vines are common.

Composition: The rainforest contains many tree species including Red Cedar *Toona ciliata*, Giant Stinging Tree *Dendrocnide excelsa*, Cabbage Palm *Livistona australis*, Native Tamarind *Diploglottis australis*, Native Quince *Alectryon subcinereus* and Bolwarra *Eupomatia laurina*. In the northern part of the property, tall eucalypts are mixed with the rainforest. Ferns such as Giant Maidenhair *Adiantum formosum*, Rasp Fern *Doodia aspera* and Sickle Fern *Pellaea falcata* are common. Vines are abundant in most places, particularly the Water Vines *Cissus* spp., Common Milk Vine *Marsdenia rostrata*, Austral Sarsaparilla *Smilax australis*, Wonga Vine *Pandorea pandorana* and, at the edge of the rainforest, the Native Raspberries *Rubus* spp.

Condition: Most of the rainforest in the study area is in good condition, although some is regrowth and the edges have been affected by grazing and other farming activities.

ii. Blue Gum - White-topped Box Tall Forest

Map Unit: SAL-QUD

Occurrence: Blue Gum - White-topped Box tall forest occurs on the upper escarpment slopes, mainly on sites with a moist aspect, such as slopes to the south and east.

Structure: This community is more than 30 metres in height. It has a dense rainforest understorey in most places and large eucalypts emerge from the rainforest canopy.

Composition: This community is dominated by Blue Gum *Eucalyptus saligna* - *Eucalyptus botryoides* and White-topped Box *Eucalyptus quadrangulata*. Brown Barrel *Eucalyptus fastigata* is occasional at higher altitudes. Near Keenan's Pass, the forest contains Yellow Stringybark *Eucalyptus muelleriana* and Gully Gum *Eucalyptus smithii*, and many rainforest trees are present, which is usually the case in this community. The understorey is mainly composed of rainforest species; the common rainforest trees include Red Cedar *Toona ciliata*, Sassafras *Doryphora sassafras*, Lilly Pilly *Acmena smithii*, Native Laurel *Cryptocarya glaucescens* and Sweet Pittosporum *Pittosporum undulatum*. The tree wattles Two-veined Hickory *Acacia binervata* and Blackwood *Acacia melanoxylon* occur in some places. Shrubs and small trees are common, including Broad-leaf Star-hair *Astrotricha latifolia*, Fireweed Groundsel *Senecio linearifolius*, Brush Kurrajong *Commersonia fraseri*, Snow Daisy-bush *Olearia lirata* and Rosewood *Synoum glandulosum*. Most of the ferns and vines that grow in the rainforest, described above, also occur in this community.

Condition: The Blue Gum - White-topped Box tall forest is generally in good condition and there is little evidence of habitat degradation. However, selective logging has been undertaken in most places and, where the forest abuts grazing land, it is affected by farming activities.

iii. Blue Gum Tall Forest

Map Unit: SAL-SYN

Occurrence: Blue Gum forest grows on lower escarpment slopes with a dry aspect, in contrast to the previous community that occurs on moist slopes.

Structure: This forest is about 25 metres in height. The understorey is rather variable, ranging from rainforest in some moist locations to a very open understorey on some drier sites.

Composition: This community is dominated by Blue Gum *Eucalyptus saligna* - *Eucalyptus botryoides*. The associated species are Turpentine *Syncarpia glomulifera*, Sydney Peppermint *Eucalyptus piperita*, Rough-barked Apple *Angophora floribunda* and River Peppermint *Eucalyptus elata*. The understorey contains rainforest species in moist locations, while drier sites are more open and have a different assemblage of species. Species such as Burrawang *Macrozamia communis*, Large Tussock *Poa labillardieri*, Guinea Flower *Hibbertia scandens*, Common Bracken *Pteridium esculentum*, Brush Daisy-bush *Olearia viscidula* and Soft Bracken *Calochlaena dubia* are all common in the understorey, as well as hardy rainforest species such as Black Plum *Diospyros australis*, Red Cedar *Toona ciliata* and Cheesetree *Glochidion ferdinandi*. The tree wattles Two-veined Hickory *Acacia binervata* and Black Wattle *Acacia mearnsii* are common in areas of regrowth.

Condition: Most of the Blue Gum tall forest on the property has been cleared and logged, and the remaining areas of this forest type continue to be adversely affected by the grazing regime. The forest on the eastern side of Barrengarry Creek is in good condition, having suffered less than the forest on the western side of the creek, although it too has been mostly logged over the years.

iv. Red Gum - Angophora Forest

Map Unit: TER-ANG

Occurrence: The Red Gum - Angophora forest occurs on the dry, west facing slopes in the lower part of the valley, east of Barrengarry Creek.

Structure: This community is about 20 metres tall. The understorey is quite open in most places.

Composition: The Red Gum - Angophora forest is dominated by Forest Red Gum *Eucalyptus tereticornis*, growing in association with Blue Gum *Eucalyptus saligna*-*Eucalyptus botryoides* and Rough-barked Apple *Angophora floribunda*. The rather open understorey contains Everlasting *Ozothamnus diosmifolius*, Spiny-headed Mat-rush *Lomandra longifolia*, Common Bracken *Pteridium esculentum*, Large Tussock *Poa labillardieri*, Kidney Weed *Dichondra repens*, Native Raspberry *Rubus parvifolius* and other species.

Condition: The Red Gum - Angophora forest on the property is generally in a good condition, despite logging and partial clearing of the stand.

v. River Oak Forest

Map Unit: CAS-CUN

Occurrence: The River Oak forest occurs on alluvial soils along Barrengarry Creek.

Structure: The community grows to more than 30 metres in height and contains very large specimens of the dominant tree species. The understorey is rather open in most places, because of the rocky stream bed and the presence of pools.

Composition: The forest is dominated by large River Oaks *Casuarina cunninghamiana*. Medium-sized Water Gums *Tristaniopsis laurina* and some rainforest trees such as Sandpaper Fig *Ficus coronata* and Koda *Ehretia acuminata* occur here and there. Tree Violet *Hymenandra dentata*, a shrub species, is common. The species in the ground cover are typical of moist, shady places; these include Spiny-headed Mat-rush *Lomandra longifolia*, Forest Starwort *Stellaria flaccida*, Giant Maidenhair *Adiantum formosum*, Stinging Nettle *Urtica incisa*, Sickie Fern *Pellaea falcata* and Fishbone Water Fern *Blechnum nudum*. The epiphytic Elkhorn *Platynerium bifurcatum* is common on the River Oaks in some places. Monkey-rope Vine *Parsonsia straminea* is moderately common.

Condition: The River Oak forest is in a good natural condition. It appears that few trees have been cleared.

1.2 THREATENED AND RARE PLANT SPECIES

The *Threatened Species Conservation Act 1995* provides legislative protection for flora and fauna considered to be threatened in New South Wales. Threatened species are listed on the schedules attached to the Act, and are classified either as "endangered" (Schedule 1 species), "vulnerable" (Schedule 2 species) or "presumed extinct" (Schedule 1, Part 4).

No threatened plant species were recorded on the property at Bunkers Hill, although one rare species, *Typhonium eliosurum* (family Araceae), has been found. This ROTAP species (Briggs & Leigh 1996) was discussed in the previous report. One of the *Typhonium eliosurum* populations appears to be in the previous report.

One of the regionally rare rainforest species defined by Mills (1988), *Deeringia amaranthoides* (family Amaranthaceae), was found in the rainforest along the gully in the study area. The following comments about the species were made (Mills 1988):

***Deeringia amaranthoides* (Lamk.) Merrill (Amaranthaceae)**

This species is represented in the NSW Herbarium by only a few collections from New South Wales, with no collections from the Illawarra region. In the Illawarra, the author has records for Gerroa, Kangaroo Valley, Ulladulla and Royal National Park. All of these specimens were in subtropical rainforest. The species is also listed on the plant list for Minnamurra Falls, near Jamberoo (Benson 1981). The species must be regarded as being rare in the region and possibly also in the state. This species occurs in the following conservation reserves in the region: 5, 7, 17."

Deeringia amaranthoides has subsequently been found at several other locations, but is still regarded as being rare in the region. There are several specimens of this shrub species in the study area, in rainforest in the gully.

2 FAUNA AND FAUNA HABITATS

Long-nosed Potoroo

A trapping program was undertaken over a period of three nights, using ten "bandicoot" cage traps along two transects through the study area. Five traps were positioned in rainforest habitat along the creek and five were located nearby in eucalypt forest, where there were patches of dense shrubs and thick cover. Searches were undertaken during the day for diggings that may have been made by this species.

Spotted-tailed Quoll

Searches were undertaken for scats of the quoll, and the species was also sought at night during spotlight surveys.

Powerful Owl

Daytime searches were undertaken for roost sites of the Powerful Owl, which are characterised by whitewash and the remains of prey below trees with dense foliage. Spotlighting was used for three nights to locate the species, and pre-recorded cassette tapes of Powerful Owl calls were played each night in an attempt to illicit responses.

Sooty Owl

Daytime searches were undertaken for roost sites of the Sooty Owl, which are also characterised by whitewash and the remains of prey below trees with dense foliage. Spotlighting was used for three nights to locate the species, and pre-recorded cassette tapes of Sooty Owl calls were played each night in an attempt to illicit responses.

Yellow-bellied Glider

Spotlighting was used to locate arboreal mammals in and near the study area, including the threatened Yellow-bellied Glider. A search was undertaken for the characteristic feeding scars of this species on the eucalypts in the study area.

Masked Owl

Daytime searches were undertaken for roost sites of the Masked Owl which, like the roost sites of Powerful Owls and Sooty Owls, are marked by whitewash and the remains of prey below trees with dense foliage. Spotlighting was used for three nights to locate the species, and pre-recorded cassette tapes of Masked Owl calls were played each night in an attempt to illicit responses.

Threatened Frogs

Night-time searches were undertaken for frogs, including the Giant Burrowing Frog and the Barred Frogs. Frogs were also identified by their call.

Threatened Bats

The ANABAT ultrasonic call detection system was used for two hours on each night for a period of three nights to detect any bats present in the study area. All habitat types in the study area were surveyed for bats.

The nomenclature in this report is based on the Australian Museum's *The Mammals of Australia* edited by Strahan (1995), the Royal Australasian Ornithologists Union's *The Taxonomy and Species of Birds of Australia and its Territories* by Christidis and Boles (1994) and *Reptiles and Amphibians of Australia* by Cogger (1992).

2.2 FAUNA HABITATS

The habitats in the study area are similar to the habitats described in the previous report, which related to the whole Bunkers Hill property. The habitats in the study area are described below; there are three main native habitats: rainforest, tall eucalypt forest and the creek, as well as cleared land.

i. Rainforest

The rainforest habitat in the study area occurs in the narrow rocky gully of the small creek, which is a tributary of Barrengarry Creek. This habitat is relatively moist compared to the surrounding eucalypt forest, although the creek was dry at the time of inspection and probably flows only after prolonged heavy rain. The rainforest has a low canopy and lacks trees with hollows. The understorey is quite open, but contains dense patches of ferns and the introduced weed known as Mistflower *Ageratine riparia*; these may provide good cover for the movement of small ground-dwelling animals. Habitat niches are also abundant at ground level, for there are many logs on the floor of the forest, as well as rocky areas. The soil is loamy and leaf litter is plentiful.

ii. Tall Eucalypt Forest

The eucalypt forest habitat is tall, about 35 metres in height, but hollows are uncommon because the forest has been logged and the largest trees removed; see Table 1. The understorey is quite open, small trees and shrubs being uncommon. At ground level, however, there is a dense cover of ferns growing to about one metre in height, as well as other ground cover plants, growing among large rocks and boulders. Although leaf litter is plentiful on the ground there are few organic habitat niches, because there are few fallen trees and logs. Boulders occur here and there. There is no evidence of recent bushfire in this habitat or in the other two habitats.

Table 1
Results of Tree Survey in the Study Area

Species	DBH (Hollows) ¹	No. of Trees
<i>Eucalyptus saligna</i> / <i>Eucalyptus botryoides</i>	102(1); 70(1); 56(0); 41(1); 34(0)	5
<i>Eucalyptus elata</i>	96(1); 95(1); 62(1); 58(0); 41(0); 40(0); 35(0); 31(0); 30(0); 23(0)	10
<i>Acacia maidenii</i>	31(0); 30(0)	2
Dead tree	-(1)	1
Estimated number of live trees per hectare		340

1. DBH: diameter of trunk at breast height in cm (number of visible tree hollows).

iii. The Creek

Barrengarry Creek contains aquatic habitats and sheltered riparian habitats to complement the drier and more exposed habitats elsewhere on the property. In the study area, there are shallow pools and pools of medium depth, laced together by short sections of rapids and often flanked by broad surfaces of rock. The habitats along the banks of the creek include a mature but narrow forest of River Oaks *Casuarina cunninghamiana*, earthen banks interspersed with rocky areas.

iv. Cleared Land

The cleared land in the study area functions as pasture for grazing domestic stock. This habitat is common in Kangaroo Valley but it is not a natural habitat and attracts few native fauna species.

2.3 FAUNA SPECIES

Mammals

Ten native mammal species and four introduced species were recorded on the Bunkers Hill property during this study; see Table 2. Table 2 also indicates what native and introduced mammals were recorded in the study area.

The Swamp Wallaby *Wallabia bicolor* and Common Wombat *Vombatus ursinus* were regularly observed at night in and near the study area; the evidence of Wombats was common on the flats near the creek, where there were copious quantities of dung, diggings and burrows. The Short-beaked Echidna *Tachyglossus aculeatus* was observed in and near the study area in 1996 and 1997. Three arboreal mammal species were recorded in the study area: the Greater Glider *Petauroides volans* and Common Ringtail Possum *Pseudocheirus peregrinus* were observed at night and dung of the Common Brushtail Possum *Trichosurus vulpecula* was found in the rainforest.

Based on the survey results, the population size of the latter three species is likely to be low. The following results were obtained:

Night 1: Common Ringtail Possum (2), Greater Glider (1);

Night 2: Greater Glider (3);

Night 3: nil animals.

The Common Ringtail Possum and Greater Glider were also observed in the forest to the south of the study area but again, few animals were recorded. The Sugar Glider *Petaurus breviceps* was neither observed nor heard in the study area but is expected to occur in the area.

Two small ground mammal species were recorded in the study area: the Bush Rat *Rattus fuscipes* and the Brown Antechinus *Antechinus stuartii*. The Bush Rat is common in the area; it was trapped in five of the ten cage traps on the third night of trapping, four of them in the five traps along the gully in rainforest. Dung thought to have been deposited by the Brown Antechinus was found on rocks in the same gully; this species is almost ubiquitous in the region. Two bats were recorded in the study area: a Forest Bat *Vespadelus* sp. and the Yellow-bellied Sheath-tail-bat *Saccolaimus flaviventris*, a threatened species.

The Eastern Grey Kangaroos *Macropus giganteus* observed on the property in 1996 were introduced to this part of Kangaroo Valley by a local land owner.

Three non-native introduced mammal species were recorded on the property, and one of these, the Feral Goat *Capra hircus*, was recorded in the study area. The Fox *Vulpes vulpes* is expected in the study area and the Feral Cat *Felis catus* may also be present. The Rabbit *Oryctolagus cuniculus* is restricted to cleared land, but appears to be uncommon in the area.

Table 2**Mammal Species recorded on the Property and/or in the Study Area**

Species	Notes	Study Area	Elsewhere on the Property
Brown Antechinus	<i>Antechinus stuartii</i>	X	
Bush Rat	<i>Rattus fuscipes</i>	X	
Common Brushtail Possum	<i>Trichosurus vulpecula</i>	X	
Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>	X	X
Common Wombat	<i>Vombatus ursinus</i>	X	X
Eastern Grey Kangaroo*	<i>Macropus giganteus</i>		X
Feral Goat*	<i>Capra hircus</i>	X	X
Forest Bat	<i>Vespadelus</i> sp.	X	
Fox*	<i>Vulpes vulpes</i>		X
Greater Glider	<i>Petauroides volans</i>	X	X
Rabbit*	<i>Oryctolagus cuniculus</i>		X
Short-beaked Echidna	<i>Tachyglossus aculeatus</i>	X	X
Swamp Wallaby	<i>Wallabia bicolor</i>	X	X
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	X	

* Introduced species.

Birds

The bird species recorded in the study area are listed in Table 3, together with the species recorded elsewhere on the Bunkers Hill property during this and the previous study. A total of 61 native bird species have been recorded on the property, 38 of them in the study area over the three day survey period.

Table 3**Bird Species recorded on the Property and/or in the Study Area**

Species	Notes
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>
Australian Hobby	<i>Falco longipennis</i>
Australian King-Parrot	<i>Alisterus scapularis</i>
Australian Magpie	<i>Gymnorhina tibicen</i>
Australian Raven	<i>Corvus coronoides</i>
Australian Wood Duck	<i>Chenonetta jubata</i>
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>
Black-faced Monarch	<i>Monarcha melanopsis</i>
Brown Cuckoo-Dove	<i>Macropygia amboinensis</i>
Brown Gerygone	<i>Gerygone mouki</i>
Brown Thornbill	<i>Acanthiza pusilla</i>
Brush Cuckoo	<i>Cacomantis variolosus</i>
Cicadabird	<i>Coracina tenuirostris</i>
Common Koel	<i>Eudynamys scolopacea</i>
Crimson Rosella	<i>Platycercus elegans</i>
Dollarbird	<i>Eurystomus orientalis</i>
Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>
Eastern Whipbird	<i>Psophodes olivaceus</i>
Eastern Yellow Robin	<i>Eopsaltria australis</i>
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>
Galah	<i>Cacatua roseicapilla</i>
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>
Golden Whistler	<i>Pachycephala pectoralis</i>
Grey Butcherbird	<i>Cracticus torquatus</i>
Grey Fantail	<i>Rhipidura fuliginosa</i>
Grey Shrike-thrush	<i>Colluricincla harmonica</i>
Laughing Kookaburra	<i>Dacelo novaeguineae</i>
Lewin's Honeyeater	<i>Meliphaga lewinii</i>
Magpie-lark	<i>Grallina cyanoleuca</i>
Masked Lapwing	<i>Vanellus miles</i>
Mistletoebird	<i>Dicaeum hirundinaceum</i>
Nankeen Kestrel	<i>Falco cenchroides</i>
New Holland Honeyeater	<i>Phylidonyris novaehollandiae</i>
Noisy Friarbird	<i>Philemon corniculatus</i>
Olive-backed Oriole	<i>Oriolus sagittatus</i>
Pacific Black Duck	<i>Anas superciliosa</i>
Pied Currawong	<i>Strepera graculina</i>
Pilotbird	<i>Pycnoptilus floccosus</i>
Red-browed Finch	<i>Neochmia temporalis</i>
Rufous Fantail	<i>Rhipidura rufifrons</i>
Rufous Whistler	<i>Pachycephala rufiventris</i>
Satin Bowerbird	<i>Ptilonorhynchus violaceus</i>
Silvereye	<i>Zosterops lateralis</i>
Southern Boobook	<i>Ninox novaeseelandiae</i>
Spotted Pardalote	<i>Pardalotus punctatus</i>
Striated Pardalote	<i>Pardalotus striatus</i>
Striated Thornbill	<i>Acanthiza lineata</i>
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>
Superb Fairy-wren	<i>Malurus cyaneus</i>
Superb Lyrebird	<i>Menura novaehollandiae</i>
Tawny Frogmouth	<i>Podargus strigoides</i>
Variigated Fairy-wren	<i>Malurus lamberti</i>
Welcome Swallow	<i>Hirundo neoxena</i>
White-browed Scrub-wren	<i>Sericornis frontalis</i>
White-faced Heron	<i>Egretta novaehollandiae</i>
White-necked Heron	<i>Ardea pacifica</i>
White-throated Treecreeper	<i>Cormobates leucophaeus</i>

Willie Wagtail	<i>Rhipidura leucophrys</i>
Wonga Pigeon	<i>Leucosarcia melanoleuca</i>
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>
Yellow-tailed Black-Cockatoo	<i>Calyptrorhynchus funereus</i>

Bird counts were undertaken in the study area during the three day field survey. To gauge the diversity of species in the study area, five bird counts were undertaken over a period of at least one hour. The results are provided in Table 4, which show that 32 species were recorded during the surveys. Although obviously not a comprehensive list of the birds expected to occur in the study area, because it was undertaken in summer it provides a fair indication of the avifauna community in the area.

Table 4
Results of Bird Counts

Common Name ¹	18.12.97 8.00-9.15am	18.12.97 5.15-6.15pm	19.12.97 8.00-9.00am	19.12.97 5.20-6.20pm	20.12.97 9.15-10.15am
Australian King-Parrot	3	1	1	5	2
Australian Magpie				1	1
Australian Raven	1	1	1		2
Black-faced Monarch	1	2	1	1	1
Brown Cuckoo-Dove	1	1	2		
Brown Gerygone	2	1	2	3	3
Brown Thornbill	6	4	4	4	4
Brush Cuckoo	1	1			
Cicadabird	2	1	1		
Crimson Rosella	4	2	6	2	5
Eastern Spinebill	5	4	3	3	4
Eastern Whipbird	1				2
Fan-tailed Cuckoo	2	1	1		
Gang-gang Cockatoo	2	1			
Golden Whistler	1		1	2	2
Grey Butcherbird	1	1	1	1	1
Grey Fantail	2	1	1	1	1
Grey Shrike-thrush		1	1		
Laughing Kookaburra	2	2	1	1	1
Lewin's Honeyeater	3	2	3	3	2
Mistletoebird			1	1	
Noisy Friarbird	3	1	1	1	1
Pied Currawong	2	3	1	2	2
Rufous Fantail	1	1	1		2
Satin Bowerbird	1	2	1		1
Spotted Pardalote					2
Striated Thornbill	5	3	7	3	6
Superb Fairy-wren	4	3	3	3	2
Variiegated Fairy-wren		1			
White-browed Scrubwren	4	1		3	4
White-throated Treecreeper	2	1	2	2	1
Yellow-faced Honeyeater	1				1
No. Species	27	26	24	19	24

1. The taxonomic names can be ascertained from Table 3.

Amphibians and Reptiles

The reptile and amphibian species recorded in the study area are listed in Table 5, together with the species recorded elsewhere on the property during this and the previous study. Nine reptiles and seven frog species have been recorded on the property; seven of the reptiles and three of the frog species have been recorded in the study area. All are common and widespread species; no threatened or uncommon species were found although the Brown Toadlet, recorded in 1996, is apparently becoming less common. The most common species in the study area were the Leaf Green Tree Frog *Litoria phyllochloa* and Lesueur's Tree Frog *Litoria lesueurii*, both of which were abundant along Barrengarry Creek.

Table 5
Reptile and Amphibian Species recorded on the Property and/or in the Study Area

Species	Taxonomic Name
Reptiles	
Diamond Python	<i>Morelia spilota</i>
Eastern Blue-tongued Lizard ¹	<i>Tiliqua scincoides</i>
Eastern Water Dragon	<i>Physignathus lesueurii</i>
Eastern Water Skink	<i>Eulamprus quoyii</i>
Golden-crowned Snake	<i>Cacophis squamulosus</i>
Grass Skink	<i>Lampropholis guichenoti</i>
Red-bellied Black Snake	<i>Pseudophryne porphyriacus</i>
Eastern Tiger Snake ¹	<i>Notechis scutatus</i>
Weasel Skink	<i>Saproscincus mustelinus</i>
Amphibians	
Bleating Tree Frog	<i>Litoria dentata</i>
Brown Toadlet	<i>Pseudophryne bibroni</i>
Common Eastern Froglet	<i>Crinia signifera</i>
Leaf Green Tree Frog	<i>Litoria phyllochloa</i>
Lesueur's Tree Frog	<i>Litoria lesueurii</i>
Peron's Tree Frog	<i>Limnodynastes peronii</i>
Verreaux's Tree Frog	<i>Litoria verreauxii</i>

1. Reported by owner.

2.4 THREATENED FAUNA

The *Threatened Species Conservation Act 1995* provides legislative protection for flora and fauna considered to be threatened in New South Wales; these species are listed on the schedules attached to the Act. No threatened species were recorded on the property in the previous study, but threatened species known to occur in the vicinity of the property or that could reasonably be expected to occur there, were discussed (Kevin Mills & Associates 1996).

Following discussions with the National Parks and Wildlife Service, several threatened species requiring further investigation during this study were identified; these are listed in Table 6. The species were divided into two groups: species for detailed study and species for general assessment. The first group contains the threatened species most likely to occur in the study area and be adversely affected by the proposed subdivision. The second group contains the threatened species that, while not expected to occur in the study area, may occur there.

Table 6
Checklist of Threatened Fauna for the Study Area

Group 1: Species for Detailed Study

Long-nosed Potoroo	<i>Potorous tridactylus</i>
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>
Powerful Owl	<i>Ninox strenua</i>
Sooty Owl	<i>Tyto tenebricosa</i>

Group 2: Species for General Assessment Only

Yellow-bellied Glider	<i>Petaurus australis</i>
Masked Owl	<i>Tyto novaehollandiae</i>
Giant Barred Frog	<i>Mixophyes iteratus</i>
Stuttering Frog	<i>Mixophyes balbus</i>
Threatened Bats	

Group 1: Species for Detailed Study

Long-nosed Potoroo

Status in New South Wales: Vulnerable; the species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population and distribution have been severely reduced, the threatening processes are severe and it is an ecological specialist (NPWS 1992).

Distribution and Abundance: The Long-nosed Potoroo *Potorous tridactylus tridactylus* occurs in southeastern Queensland, coastal New South Wales and Victoria, southeastern South Australia and in southwestern Western Australia. The distribution of the species has contracted throughout its range on the mainland. The Long-nosed Potoroo in Tasmania and on the Bass Strait islands is considered to be a separate subspecies, *Potorous tridactylus apicalis*.

Habitat, etc: Johnson reports that the Long-nosed Potoroo occurs in a wide range of habitats ranging from coastal heath to wet and dry sclerophyll forests. It is generally restricted to areas with a rainfall in excess of 760mm per year, and is more likely to occur in locations on light sandy soils (Johnson 1995). The species requires dense shrubs and thick ground cover vegetation for food, shelter and camouflage, and it rarely ventures far from cover. The diet of the Long-nosed Potoroo consists substantially of underground fungi (Claridge 1993) as well as leaves, seeds and invertebrates.

Threats: Large areas of habitat suitable for the Long-nosed Potoroo and other small mammal species were destroyed in New South Wales when the forests were logged, or cleared for agricultural purposes. Fragmentation of the remaining habitat increases the vulnerability of this animal and the risk of local extinctions. Where the species has survived, it is threatened by introduced predators such as the Fox *Vulpes vulpes* and the Dog *Canis familiaris*, and by inappropriate fire regimes. Catling (1991) found the Long-nosed Potoroo to be disadvantaged by a simplification of the forest structure caused by frequent low-intensity burns.

Regional Occurrence: Little is known about the distribution and abundance of the Long-nosed Potoroo in the Shoalhaven area. A single animal was recorded in dense understorey vegetation at Barren Grounds Nature Reserve in 1988 (RAOU 1988) and the species still exists there. Robinson recorded the species in the same location in 1985 (Robinson 1985) and noted that it once occurred in many other parts of the Illawarra district as well (Robinson 1987 and 1988). However, because no survey data were provided, it is impossible to know which records were recent and which were historical, and to differentiate between substantiated records and

unconfirmed reports by local residents. Most reports of the Long-nosed Potoroo in the district are from locations along the Illawarra Escarpment and Cambewarra Range, from Barren Grounds to Cambewarra.

Potential to Occur in the Study Area: The Long-nosed Potoroo has been reported from several locations along the northern escarpment of Kangaroo Valley. Robinson (1988) reported the species from "Belmore Falls to Barrengarry Pass", Carrington Falls and Bunkers Hill. Robinson probably recorded the species in the late 1960s, when most of his field work was undertaken. The species may still occur in the Bunkers Hill area, where there are large areas of ideal habitat.

Results of Surveys in the Study Area: No Long-nosed Potoroos were caught during the trapping program. Some small holes of various shape and depth were found in the gully containing rainforest, but they may have been dug by one or other of several species, including the Long-nosed Bandicoot *Perameles nasuta*, Bush Rat *Rattus fuscipes* or Short-beaked Echidna *Tachyglossus acoleatus*.

The small number of holes suggests that the level of activity in the area is low, whichever species are involved. Only Bush Rats were trapped in the gully. Although Long-nosed Potoroos may occur in the general area, there is no evidence that they occur in the study area.

Spotted-tailed Quoll

Status in New South Wales: The Spotted-tailed Quoll is referred to as the Tiger Quoll in the *Threatened Species Conservation Act 1995*. The species is considered to be vulnerable in New South Wales, listed on Schedule 2 because its population and distribution have been severely reduced, the threatening processes are severe and it is an ecological specialist (NPWS 1992).

Distribution and Abundance: The range of the Spotted-tailed Quoll *Dasyurus maculatus maculatus* extends along the east coast of Australia from southern Queensland to southern Victoria and Tasmania. The distribution is now disjunct over most of its range. The species once occurred in South Australia but is now thought to be extinct in that state. There is another subspecies, *gracilis*, in northern Queensland.

Habitat, etc.: The Spotted-tailed Quoll lives in a wide variety of habitats including rainforest and eucalypt forest, woodlands and coastal heath. It has a large home range, 1287 to 1452 hectares for males and 614 to 1067 hectares for females (Edgar & Belcher 1995). Dens are found in hollow logs, tree hollows, caves and crevices. The Spotted-tailed Quoll is usually a terrestrial species although, as an agile climber, it is partly arboreal. Its diet mainly consists of medium sized mammals but includes birds, small mammals and carrion.

Threats: The species is thought to have declined because of competition from cats and foxes. It has also been shot, poisoned and trapped, for it was generally regarded as a pest in rural areas. The clearing of habitat is another reason for its decline. Not only has there been a huge loss of habitat area, but the species' distribution is now disjunct over much of its range. It is still threatened by habitat loss, as the remaining habitat becomes increasingly fragmented and populations become isolated. As Edgar and Belcher (1995) commented, the species "now exists mostly in isolated areas that may be too small to support long-term viable populations while current land management practices continue".

Regional Occurrence: The Spotted-tailed Quoll occurs in the forests along the Illawarra Escarpment and Cambewarra Range. There has been an increasing number of reports in recent years from Macquarie Pass to Kangaroo Valley.

Potential to Occur in the Study Area: The Spotted-tailed Quoll is likely to occur in the forests in the Bunkers Hill area. It is regularly recorded in similar habitats along the Illawarra Escarpment and Cambewarra Range.

Results of Surveys in the Study Area: Searches for the scats of the Spotted-tailed Quoll were undertaken throughout the study area; rocks and logs were particularly targeted. Animals were also sought at night with spotlights. The species was not recorded during the three day field study. The species may occur in the study area, but the area would form only part of its home range. Quolls have a large home range.

Powerful Owl

Status in New South Wales: The Powerful Owl is listed on Schedule 2 of the *Threatened Species Conservation Act 1995*; it is vulnerable in New South Wales. The species was listed because its population is suspected to have been reduced, its distribution has been reduced, the potential for recovery is poor, the threatening processes are moderate and it is an ecological specialist (NPWS 1992).

Distribution and Abundance: The Powerful Owl occurs along the coast and ranges of eastern Australia, from near Rockhampton in Queensland, southwards throughout eastern New South Wales and Victoria. It mainly occurs on the coastal side of the Great Dividing Range but in some places its distribution extends inland to the western slopes. The size of the population remains unknown, but the species is thinly distributed across this range.

Habitat, etc.: The Powerful Owl prefers tall moist open eucalypt forests on hilly terrain, sometimes with a rainforest component, but is known to occur in a wider range of forest types such as drier forest and woodland, and urban bushland. This summary is supported by Debus and Chafer (1994) who found that, in New South Wales, "tall open and open forest appear to be its most important habitat types, [but] it also uses woodland and riparian habitats". The authors described the species' roosting habitat as "a variety of sites [ranging] from dense canopy and substorey trees within rainforest and open forest, often in gullies, to canopy trees in woodland. Commonly recorded roost sites in coastal areas [of southern New South Wales] are Red Turpentine *Syncarpia glomulifera* in tall open forest, and Black She-oak *Allocasuarina littoralis* in open forest . . . [with] dense crowns". At Kioloa, Davey (1993) recorded the Powerful Owl in mid and late successional forest and in uneven-aged forest, but not in forest with a development age of less than 70 years.

Estimates of the species' home range vary from 400-600 hectares per family group (Davey 1993) to 800-1,000 hectares (Schodde & Mason 1980). The quality of the habitat and the abundance of prey influence the size of the home range. The nest trees are in tall open forest or open forest, "in live eucalypts, often the largest in a stand and probably among the oldest within a patch of forest" (Debus & Chafer 1994). The nesting sites are usually large vertical hollows in tree trunks in gullies in hilly or mountainous country (Beruldsen 1980).

The Powerful Owl is reclusive and sedentary. It occupies a permanent territory, either singly or in pairs. It roosts on the branches of trees in gullies by day and hunts at night, mainly in forests with an open structure and along the edge of forests. The species mainly eats arboreal mammals such

as the Common Ringtail Possum *Pseudocheirus peregrinus*, Greater Glider *Petauroides volans*, and Sugar Glider *Petaurus breviceps*. In southern coastal New South Wales, its main prey species is the Common Ringtail Possum (Debus & Chafer 1994).

Threats: The Powerful Owl declined when forests were cleared on a large scale for farming purposes. The species is still adversely affected by the clearing of habitat and inappropriate forest management practices. Intensive logging leads to the loss of old growth elements and nesting hollows, and a reduction in the availability of prey (Braithwaite, Binns & Nowlan 1988).

Regional Occurrence: The Powerful Owl has apparently not been recorded in Kangaroo Valley, although it has been observed at Yarrunga Creek in Morton National Park. The species has been recorded at Mount Murray, Cambewarra and Macquarie Pass on the coastal side of the escarpment. The Powerful Owl would almost certainly occur in the tall forests along the escarpments in Kangaroo Valley.

Potential to Occur in the Study Area: The Powerful Owl probably occurs in the Bunkers Hill area. The tall forests in the Barrengarry Creek valley appear to be ideal habitat for this species and arboreal mammals are at least moderately common.

Results of Surveys in the Study Area: No Powerful Owls were recorded in the study area, although spotlight searches were undertaken at night and roost sites were sought during the day. Nor did the pre-recorded tapes illicit any response from the species. It is reasonable to assume that the Powerful Owl would occur at Bunkers Hill, and that it may visit the study area from time to time. However, the study area contains no special features for the species, such as tree hollows, which are uncommon.

Sooty Owl

Status in New South Wales: Vulnerable; the species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population has been severely reduced, the potential for recovery is poor, the threatening processes are severe and it is an ecological specialist (NPWS 1992).

Distribution and Abundance: The Sooty Owl *Tyto tenebricosa* occurs along the coast and ranges, from south-eastern Queensland, to eastern New South Wales and southern Victoria. Its distribution is thin and patchy. The species also occurs in New Guinea.

Habitat, etc.: The Sooty Owl lives in rainforest and tall wet eucalypt forest. Its favoured habitat is "tall wet old-growth forest on fertile soils with a dense understorey and emergent tall eucalypts" (Garnett 1992); such forest usually occurs along creeks and in gullies. Tree hollows for nesting and roosting are essential, as well as abundant prey. The species has a large home range, estimated by Milledge, Palmer and Nelson (1991) to be 600-800 hectares and by Schodde and Mason (1980) to be 200-800 hectares. It is known to occur within a mosaic of forests, logged and unlogged (Kavanagh & Bamkin 1994), young, maturing and old (e.g. Davey 1993 and Milledge *et al.* 1991). The Sooty Owl mainly preys on arboreal mammals, but its diet also includes terrestrial mammals and birds.

Threats: The main threat to the Sooty Owl has been the clearing of forests for agriculture and, later, for urban development. Now that the rate of clearing has slowed, the main threat is the "disturbance of creekside rainforest, particularly of trees suitable for nesting, as a result of logging operations within the range of the species" (Tanton 1994).

Regional Occurrence: The Sooty Owl has been recorded in many parts of the region, usually in the moist forests along the Illawarra Escarpment. Although thinly distributed, it is likely to occur throughout the region wherever there are tall moist forests and rainforest.

Potential to Occur in the Study Area: The Sooty Owl has been recorded on Jamberoo Mountain and at Cambewarra, and no doubt also occurs in Kangaroo Valley. The species probably lives in the Barrengarry Creek valley, where there is suitable habitat, although its presence there has not been confirmed. The Sooty Owl is likely to occur in the study area from time to time.

Results of Surveys in the Study Area: No Sooty Owls were recorded in the study area, although spotlight searches were undertaken at night and roost sites were sought during the day. Nor did the pre-recorded tapes illicit any response from the species. It is reasonable to assume that the Sooty Owl would occur at Bunkers Hill, and that it may visit the study area from time to time. However, the study area contains no special features for the species, such as tree hollows, which are uncommon.

Group 2: Species for General Assessment Only

Yellow-bellied Glider

Status in New South Wales: Vulnerable; species listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population and distribution have been severely reduced, the potential for recovery is poor, the threatening processes are severe and it is an ecological specialist (NPWS 1992).

Distribution and Abundance: The Yellow-bellied Glider *Petaurus australis* inhabits the coast and ranges of eastern Australia, usually east of the Great Dividing Range. Its range extends from central Queensland to southern Victoria. Another subspecies, *reginae*, occurs in northern Queensland. Although the Yellow-bellied Glider may be locally common, its distribution is patchy.

Habitat, etc.: The Yellow-bellied Glider inhabits tall, mature moist eucalypt forests. Its preferred habitat is characterised by a mosaic of tree species associations including species that flower in winter (Kavanagh 1987). Its diet is composed of nectar, pollen, insects and eucalypt sap and, while it utilises many eucalypt species for food, it usually confines itself to only a few species in a particular district. Furthermore, the glider favours some trees of those species while apparently ignoring others; large trees are preferred. The presence of Yellow-bellied Gliders is often indicated by V-shaped marks incised through the bark of a eucalypt; the glider feeds on the sap as it oozes from the tree. The Yellow-bellied Glider has a very large home range, probably because its sources of food are seasonal and ephemeral. A small family group of two to five animals occupies between 30 and 65 hectares (Goldingay & Kavanagh 1991).

Threats: The Yellow-bellied Glider no doubt declined when large areas of forest were felled for agriculture and other landuses. It is also adversely affected by changes to the structure of its forest habitat, for it prefers large trees for feeding and needs nesting hollows. Logging and wildfire have both caused such changes.

Regional Occurrence: The Yellow-bellied Glider occurs throughout the Shoalhaven region. Most records come from within or near Grey Gum *Eucalyptus punctata* and Spotted Gum *Eucalyptus maculata* forests. There are suitable Grey Gum forests in the western part of Kangaroo Valley but

we are not aware of any records of Yellow-bellied Gliders from the escarpments in the eastern part of Kangaroo Valley.

Potential to Occur in the Study Area: The Yellow-bellied Glider has been recorded on the Illawarra Escarpment and Cambewarra Range, so it may occur in the study area. Robinson (1988) reported that the species occurs on the northern side of Kangaroo Valley but the exact date and location of the record are unknown. Most of Robinson's field studies were undertaken in the late 1960s.

Results of Surveys in the Study Area: No Yellow-bellied Gliders were recorded during the spotlight surveys and none of their characteristic feeding scars were found on the trees in the study area. The species may occur in the Bunkers Hill area but does not appear to occur in or near the study area.

Masked Owl

Status in New South Wales: Vulnerable; the species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population and distribution are suspected to have been reduced, the potential for recovery is poor, the threatening processes are moderate and it is an ecological specialist (NPWS 1992).

Distribution and Abundance: The Masked Owl occurs in Australia and New Guinea. Although it has been recorded in all states, mainly in coastal areas, its distribution is very sparse and it is recorded only rarely. It is more common in Tasmania. There are four subspecies of the Masked Owl *Tyto novaehollandiae*. The range of the southern subspecies *novaehollandiae*, which occurs in New South Wales, extends from Cooktown in Queensland to the southern coastline of the mainland, and west to the Pilbara region in Western Australia. In New South Wales, the Masked Owl occurs mainly in and near coastal areas, but it also occurs inland (Debus & Rose 1994). Nowhere is it abundant, but it is recorded more frequently in the east than in the west.

Habitat, etc.: The Masked Owl mainly inhabits forests and woodlands. It roosts in dense trees in gullies and hunts along the edge of the forest. According to Debus and Rose (1994), it is more abundant "in regions with the greatest local diversity of forest and woodland structural formations". Its diet consists mainly of small and medium sized terrestrial mammals, at least two thirds of which are captured on the ground (Debus & Rose 1994). The Masked Owl requires tree hollows for breeding. It has a large territory of about 500-1000ha.

Threats: The decline of the Masked Owl has been linked to the decline of native mammals since European settlement (Blakers, Davies & Reilly 1984). Clearing and modification of its habitat has reduced the availability of tree hollows and the abundance of mammalian prey.

Regional Occurrence: The Masked Owl is sparsely distributed across its range and is infrequently recorded on the Australian mainland. The Masked Owl was recorded at Bangalee Reserve in 1992, but all other Shoalhaven records are from the 1930s. The species has not been recorded in Kangaroo Valley.

Potential to Occur in the Study Area: Because of the dearth of records and the rarity of this species, it is unlikely that the Masked Owl would inhabit the study area, although there is a lot of suitable habitat in the Bunkers Hill area.

Results of Surveys in the Study Area: No Masked Owls were recorded in the study area. Like the Sooty Owl, however, it may occur in the general area.

Giant Barred Frog

Status in New South Wales: The Giant Barred Frog *Mixophyes iteratus* is listed on Schedule 2 of the *Threatened Species Conservation Act 1995*; it is a vulnerable species in New South Wales. The species was listed because its population and distribution are suspected to have been reduced, the threatening processes are moderate and it is an ecological specialist (NPWS 1992).

Distribution and Abundance: The Giant Barred Frog occurs along the coast and near-coastal ranges in eastern Australia, from the Bunya Mountains in southeastern Queensland to Narooma in southern New South Wales.

Habitat, etc.: The Giant Barred Frog occurs in wet eucalypt forest and rainforest. It remains close to permanent running water during the breeding season but disperses into the forest when not breeding (Robinson 1994). Its diet consists of insects and smaller frogs.

Threats: Insufficient research has been undertaken to identify threats to the survival of the Giant Barred Frog, but the removal of rainforest habitat is probably a major determining factor.

Regional Occurrence: The Giant Barred Frog has not been recorded in the Shoalhaven area, although it may occur there. If present, it is most likely to live near creeks in the rainforests along the Illawarra Escarpment and Cambewarra Range. The absence of records may be attributable to the lack of field surveys and may not necessarily indicate that the species is absent from the region.

Potential to Occur in the Study Area: The Giant Barred Frog may occur in the Bunkers Hill area. The streams and the surrounding rainforest in the valley of Barrengarry Creek are ideal habitat for the Giant Barred Frog, although the study area contains little habitat.

Results of Surveys in the Study Area: The weather conditions during the survey period, particularly the night of 18 December were ideal for frog surveys. Several species were calling. Lesueur's Tree Frog and the Leaf Green Tree Frog were abundant along Barrengarry Creek, and other species were common in moist areas elsewhere on the property, but no barred frogs were found. Barred frogs may occur in the Bunkers Hill area, but they are unlikely to occur on the dry slopes on Lots 81 to 83.

Stuttering Frog

Status in New South Wales: The Stuttering Frog *Mixophyes balbus* is listed on Schedule 2 of the *Threatened Species Conservation Act 1995*; it is a vulnerable species in New South Wales. The species was listed because its population and distribution are suspected to have been reduced, the threatening processes are moderate and it is an ecological specialist (NPWS 1992).

Distribution and Abundance: The Stuttering Frog occurs in eastern New South Wales and Victoria, east of the Great Dividing Range.

Habitat, etc.: Little is known about the ecology of this species. It inhabits wet eucalypt forest and rainforest and subsists on insects and smaller frogs. The frogs live close to permanent streams during the breeding season.

Yellow-Bellied Sheathtail-Bat

Status in New South Wales: Vulnerable; the species is listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population is suspected to have been reduced and it is an ecological specialist (NPWS 1992).

Distribution and Abundance: The Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris* is widespread across northern and eastern Australia, but does not occur in Tasmania. Some researchers suggest that it is migratory (e.g. Parnaby 1992 and Menkhorst 1995).

Habitat, etc.: Little is known about the ecology of the Yellow-bellied Sheathtail-bat because it is seldom detected. Parnaby (1992) notes that it "is probably an above canopy or woodland forager", and Menkhorst (1995) points out that in Victoria it has been recorded in localities with "an extreme diversity of habitat and climate". Most authors comment on the species' habit of flying high and fast above the canopy. Menkhorst (1995), however, adds that the bats "also forage within 2m of the ground in clearings". Richards (1995) states that it "feeds well above the canopy but in mallee or open country it comes lower to the ground . . . Usually solitary, but occasionally occurring in colonies of less than ten individuals, the Yellow-bellied Sheathtail-bat roosts in tree hollows and has been found in the abandoned nests of Sugar Gliders . . . it is sometimes found resting on the wall of buildings".

Threats: The threats to this species are not well known.

Regional Records: The Yellow-bellied Sheathtail-bat has not previously been recorded in the Shoalhaven region, the closest record is from near Lake Illawarra in the City of Wollongong.

Results of Surveys in the Study Area: This large bat was observed hawking across a clearing on the southern edge of the study area, adjacent to large River Oaks along Barrengarry Creek. The identity of the species was determined by call analysis.

2.5 THREATENED SPECIES

The *Threatened Species Conservation Act 1995* (TSC Act) commenced on 1 January 1996 and applies to all plants and animals native to New South Wales, with the exception of humans, fish and marine vegetation. The TSC Act provides three categories of threatened species: endangered species, vulnerable species and species presumed extinct. The Act also allows for the listing and protection of "endangered populations" of any plant or animal, and of "endangered ecological communities". Threatened species are listed on the schedules attached to the Act.

The TSC Act makes various amendments to the *National Parks and Wildlife Act 1974* and the *Environmental Planning and Assessment Act 1979* (EPA Act). The TSC Act provides that the criteria in section 5A of the EPA Act must be considered in deciding whether there is likely to be a significant effect on threatened species, etc, and hence if a Species Impact Statement is required.

(a) in the case of threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction

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APPENDIX 1

LIST OF PLANT SPECIES

<i>Acacia binervata</i>	<i>Doodia aspera</i>
<i>Acacia maidenii</i>	<i>Doryphora sassafras</i>
<i>Acacia melanoxylon</i>	<i>Echinopogon ovatus</i>
<i>Acmena smithii</i>	<i>Ehretia acuminata</i>
<i>Adiantum aethiopicum</i>	<i>Elatostema reticulatus</i>
<i>Adiantum formosum</i>	<i>Eucalyptus elata</i>
<i>Adiantum hispidulum</i>	<i>Eucalyptus saligna/Euc. botryoides</i>
<i>Alectryon subcinereus</i>	<i>Eucalyptus tereticornis</i>
<i>Amyema pendulum</i>	<i>Eupomatia laurina</i>
<i>Angophora floribunda</i>	<i>Eustrephus latifolius</i>
<i>Aneilema acuminata</i>	<i>Ficus coronata</i>
<i>Aphanopetalum resinolum</i>	<i>Geitonoplesium cymosum</i>
<i>Asplenium australasicum</i>	<i>Geranium solanderi</i>
<i>Asplenium flabellifolium</i>	<i>Glycine clandestina</i>
<i>Austrocynoglossum latifolium</i>	<i>Gymnostachys anceps</i>
<i>Backhousia myrtifolia</i>	<i>Hedycarya angustifolia</i>
<i>Blechnum minus</i>	<i>Helichrysum rutidolepis</i>
<i>Blechnum nudum</i>	<i>Hibbertia scandens</i>
<i>Breynia oblongifolia</i>	<i>Hydrocotyle laxiflora</i>
<i>Callicoma serratifolia</i>	<i>Hymenanthera dentata</i>
<i>Calochlaena dubia</i>	<i>Hypolepis glandulifera</i>
<i>Carex appressa</i>	<i>Imperata cylindrica</i>
<i>Carex longibrachiata</i>	<i>Indigofera australis</i>
<i>Cassinia trinervia</i>	<i>Juncus ? usitatus</i>
<i>Casuarina cunninghamiana</i>	<i>Lastreopsis acuminata</i>
<i>Celastrus australis</i>	<i>Lastreopsis decomposita</i>
<i>Ceratopetalum apetalum</i>	<i>Leptospermum morrisonii</i>
<i>Christella dentata</i>	<i>Livistona australis</i>
<i>Cissus antarctica</i>	<i>Lomandra longifolia</i>
<i>Cissus hypoglauca</i>	<i>Macrozamia communis</i>
<i>Citriobatus pauciflorus</i>	<i>Marsdenia rostrata</i>
<i>Claoxylon australe</i>	<i>Melicope micrococca</i>
<i>Clematis aristata</i>	<i>Microlaena stipoides</i>
<i>Clerodendrum tomentosum</i>	<i>Morinda jasminoides</i>
<i>Commelina cyanea</i>	<i>Notelaea venosa</i>
<i>Commersonia fraseri</i>	<i>Notothixos subaureus</i>
<i>Cryptocarya glaucescens</i>	<i>Oplismenus imbecillis</i>
<i>Cyathea australis</i>	<i>Pandorea pandorana</i>
<i>Cynoglossum australe</i>	<i>Parsonsia straminea</i>
<i>Deeringia amaranthoides</i>	<i>Pellaea falcata</i>
<i>Dendrobium liguiforme</i>	<i>Pennantia cunninghamii</i>
<i>Dendrobium speciosum</i>	<i>Persoonia linearis</i>
<i>Dendrocnide excelsa</i>	<i>Phyllanthus gasstroemii</i>
<i>Dennstaedtia davallioides</i>	<i>Pimelea ligustrina</i>
<i>Desmodium varians</i>	<i>Piper novaehollandiae</i>
<i>Dichondra repens</i>	<i>Pittosporum revolutum</i>
<i>Diospyros australis</i>	<i>Pittosporum undulatum</i>
<i>Dipodium punctatum</i>	<i>Platynerium bifurcatum</i>

Plectranthus parviflorus
Poa labillardiera
Polygonum sp.
Pseuderanthemum variable
Pteridium esculentum
Pteris tremula
Pteris umbrosa
Pyrrhosia rupestris
Rapanea howittiana
Rubus hillii
Rubus parvifolius
Rubus rosifolius
Rumex brownii
Sarcopetalum harveyanum

Sigesbeckia orientalis
Smilax australis
Stellaria flaccida
Stephania japonica
Stipa ramosissima
Streblus brunonianus
Synoum glandulosum
Syzygium australe
Toona ciliata
Trema aspera
Tristaniopsis laurina
Tylophora barbata
Typhonium eliosurum
Urtica incisa